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IONIZING RADIATION AND A SENSE OF PROPORTION

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Common sense demands that the practitioner view the current lay and scientific alarm about the harmful effects of ionizing radiation with a sense of proportion. There is no reason for the practitioner to feel uneasy about radiation when it is being used with conservative judgment and skill. Proper perspective in an area where much clarification is needed is presented to the practitioner with no background in radiation biology or physics. Practitioners with radiation equipment must sooner or later take cognizance of the standards suggested in Handbook 60 of the NCRP. These standards are applicable to all radiation installations, not only to that of the radiologist.

The potentially harmful effects of ionizing radiation from medical sources are of importance to all practitioners of clinical medicine. The internist who does chest fluoroscopic examinations routinely, the general practitioner with a small x-ray unit in his office, the obstetrician who makes use of x-ray pelvimetry, the urologist and other surgical specialists using x-ray equipment, the dermatologist treating benign lesions, and, in brief, all physicians who make use of x-ray are vitally concerned with the possibility of harm from the use of ionizing radiation.

This paper is addressed to the practitioner with no background in radiation biology or physics in the hope that, on the basis of the facts presented, he can obtain the proper perspective in an area where much clarification is needed.

A questioning attitude on the part of many patients regarding exposure to radiation is now present. The physician, on whom the patient's ultimate faith rests, must be able to deal wisely and honestly with this problem. He must possess the proper perspective and sense of proportion regarding the use of ionizing radiation, as well as the essential facts about radiation hazards.

Those facts on which there is generalized agreement will be presented, as well as the areas of disagreement. Many of the physicians' questions about radiation are not answerable in terms of black and white. No one can give magic figures in reference to patient radiation dosage and can say that this patient has reached the limit of exposure and that another patient is entitled to three more gastrointestinal series in his lifetime. But, on the basis of our present knowledge, broad general principles can be outlined and a basic philosophy toward radiation can be developed.

Radiation and Medical Ecology

Physicians have become concerned with medical x-ray exposure because all radiation exposure is now under scrutiny. Since the advent of the nuclear age, the amount of radiation to which man is exposed

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has been increasing. Nuclear technology is still in its infancy, but it is anticipated that in a decade tremendous developments will have occurred. A major problem will be that of controlling the radiation dosage to whole populations. This is in essence a problem of medical ecology: the relationship of man to the artificial environment which his industrial civilization has produced.

There are many problems of medical ecology which are the result of industrialization. Pollution of air and bodies of water in industrial areas is of great importance, to mention one example. The control of radiation, however, differs from that of all other noxious agents in that man is not equipped by nature to detect this potential peril to his existence. A serious danger has been produced, both for man the individual and for all mankind, for which there is no sensory warning. Only the proper instruments, properly placed and tended, are useful in warning of the danger.

The recent highly publicized reports of the National Research Council entitled "The Biological Effects of Atomic Radiation" and a similar report of the British Medical Research Council, "The Hazards to Man of Nuclear and Allied Radiation,"[1] are essentially monographs in the field of medical ecology. This point, however, was missed in the highly sensationalized publicity which followed publication of these reports.

A continuing study of the effect of radiation on man is being carried out by the National Research Council, the United States Public Health Service, and a special committee of the United Nations. It is in the light of medical ecology that much of the news of radiation effects should be viewed. We must learn to live with radiation in the nuclear age, both in a physical and in an emotional sense.

National Committee on Radiation Protection

The danger of ionizing radiation has been under close scrutiny for 30 years by well-organized bodies of scientists. The fact that the hazards are not limited to national boundaries was recognized in 1926 by the action of the first International Congress of Radiology, which established the International Committee on Roentgen Units and Protection.[2]

Shortly after this, the medical radiologists of the United States organized a similar committee with its activities centered at the National Bureau of Standards in Washington, D. C.[3] Dr. Lauriston S. Taylor, an eminent radiation physicist of the bureau, has been chairman of the National Committee on Radiation Protection (NCRP) since its inception. It should be emphasized that this is not a governmental commission but is composed of representatives from private medical, scientific, and industrial fields, plus those from the federal services. It established the foundation for protection of occupational personnel in radiology through its suggested standards.[4] Its recommendations protected the workers in the development of the atomic bomb during the Manhattan District Project.

The philosophy underlying the protective measures it has outlined is based on a full utilization of all available knowledge concerning radiation effects on man. It has suggested standards which are fully protective and yet practical in their application. The importance of this committee to organized medicine and to the individual practitioner cannot be overstressed. In today's emotionally charged atmosphere in matters concerning radiation, this committee, which includes representatives from the American Medical Association, the United States Public Health Service, and the founding radiologic organizations, is the recognized authority on radiation protection. It is sympathetic to the problems of the medical profession, and it understands these problems.

Radiation Effects on Man

What, then, are the deleterious effects of radiation with which the practitioner should be concerned? They may be divided into two broad categories: (1) the genetic effects, which depend on the exposure of the gonadal tissues, and (2) the somatic effects, which depend on the exposure of other body tissue. The first is primarily of long-range concern to the race; the second is of immediate concern to the individual.

Genetic Effects.—The result of irradiation of germinal tissues is an alteration of the hereditary material contained in the nuclear chromosomes, the genes. The significant facts to be considered are as follows: (1) All geneticists agree that there is no threshold for this effect, i. e., that even the most minute dose of radiation does some damage to the genes. (2) Once damage is done, it is irreparable. In view of this, the genetic damaging effects of radiation are cumulative over the years. (3) The result of this genetic damage is to produce deviations from the norm in the offspring of the irradiated individual. These deviations are almost always undesirable. They are referred to as mutations and the resultant offspring as mutants.[5]

The mutants which have been observed to result from x-ray exposure of many different types of organisms are characterized, in general, by decreased longevity, increased susceptibility to disease, and decreased fertility. The mutant genes are usually recessive, or masked, so that the first generation offspring do not bear the full brunt of the genetic damage. Thus, contrary to public opinion, freaks and monstrosities do not often occur in the first generation following irradiation of the mother. The full expression of the damage comes in subsequent generations when there is a mating of similarly damaged genes. Partial expression of the undesirable characteristics of the damaged gene occurs prior to this and may be of so subtle a character that detection is extremely difficult.[5]

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It should be emphasized at this point that the mutations produced by radiation are in no way different from mutations which have always been occurring in the human race. There is a certain level of the mutation rate which is known to be "normal" for the human species.[5b] The concern of geneticists is that this level not be increased significantly. It has been estimated that a gonadal dose of 30 to 60 r to each individual of an entire population would result in a doubling of this normal mutation rate. It is the fear of geneticists that such an eventuality might well be disastrous for the perpetuation of the race. On the basis of the above figures, which are the result of animal experimentation, the geneticists of the National Research Council have estimated that in order to provide for a wide safety margin the average gonadal dose for large populations should not exceed 10 r.[5a]

This latter statement should be read with special care by practitioners of medicine in order to avoid missing a point which has been widely misunderstood. Geneticists are interested in total population doses, i. e., N-million roentgens per M-million individuals in the reproductive age. The statements concerning gonadal dose should thus be interpreted from the viewpoint of total reproductive population dose and not primarily of dose to the single individual regardless of age. This does not mean, of course, that the dosage to the individual can be ignored. However, if we remember that the work of the geneticist represents a portion of the ecologic study to enable mankind to live safely with radiation from all sources in the future, a perspective can be obtained which is of much practical significance to the practitioner. As physicians, we are concerned with keeping the medical radiation dosage as low as possible, but our primary concern is the welfare of the patient before us. The health of future generations is based on the maintenance of the health of the present generation.

It has been estimated that, of the 14.3 r average gonadal dose said to be allowable during the first 30 years of life, about 4.3 r comes from natural radioactive background sources. This, man has always lived with. Fallout from nuclear bomb explosions at the present rate accounts for about 0.1 r.[5a] An estimate of 4.6 r from medical-dental sources has been presented.[6] This then leaves us with a "margin" of several roentgens. Some of this will be used up in the future in exposure to industrial operations.

The lay press has presented this as a critical situation. Those who have worked with radiation hazards for many years do not feel this sense of emergency.[7]

Regardless of the accuracy of the magnitude of the above figures (and it must be emphasized that these are estimates for planning purposes, not figures with true scientific accuracy), the practical viewpoint for the practitioner to take is that radiation of all types should not be used unnecessarily. Clear medical indications should govern its use at all times. There should be a conception on the part of those actually administering radiation of the approximate number of roentgens for a given examination and the best methods for protecting the gonadal tissues for each examination.

The crux of the present problem, as it relates to medical practice, is the dissemination and utilization of already existing knowledge in the area of radiation safety.

Somatic Effects.—Radiation effects other than genetic are also of importance in relation to radiation environment. These nongonadal or somatic effects are considered by many workers to be of more immediate import than the genetic effects. The apparent increase in the incidence of leukemia has been thought by some authorities to be due, in part, to the increased use of ionizing radiation in the last half century.[8] The demonstration that roentgen therapy for such benign conditions as ankylosing spondylitis in adults and so-called thymic enlargement in infants has in later years resulted in an apparent increased incidence in neoplasia in these irradiated groups is a good cause for a reappraisal of radiation therapy for all benign conditions.[9]

It is presumed that the development of neoplasia following irradiation is due to damage of the chromosomes within the susceptible somatic tissues so that when the injured cells multiply they form damaged cells, or mutants. Over a long period of time the mutant cells may obtain superiority over the normal cells in susceptible individuals.[10]

The life-shortening effect of radiation has been demonstrated on animals who have received whole body radiation.[11] This, however, has not yet been shown for very low dosage in the order of magnitude of the background radiation nor has an effect on longevity for limited body irradiation been shown. Decreased longevity of radiologists has been reported by some observers and denied by others.[12] In analyzing these deaths, it must be remembered that the older radiologists were exposed to what we, today, would regard a dangerous level of radiation in the course of normal occupational exposure.[13]

There is still much to be learned about radiation effects in the very low dosage ranges. Whether a threshold exists for permanent radiation damage to the somatic cells is still undetermined.[14] The restorative powers of the body tissues are tremendous, as is well known to those in active medical practice. The uncertainty of extrapolating results obtained from animal experimentation to human beings must also be considered.

Use of Radiation

The points in the foregoing of practicality for physicians follow. First, it must be recognized that low-dosage radiation can possibly damage cells, at

least in certain individuals, irretrievably. It is most important that radiation be confined to the smallest possible portion of the body in all examinations and that whole body irradiation (as can occur in an improperly performed diagnostic examination) be avoided at all costs. Second, reappraisal should be made of all "routine" diagnostic examinations or reexaminations. Third, the use of radioisotopes should be carefully appraised because of the intimate contact of the radiation emitter with the body cells. Fourth, radiation procedures in children and pregnant women should be done with special care. This applies particularly to fluoroscopic examinations. Fifth, all radiation therapy for benign conditions should be carefully reappraised. The use of radiation in conditions where effective substitutes are available can no longer be considered as conservative medical practice.

Maximum Permissible Dosage.—The setting of numerical values for permissible dose of radiation is a complex problem requiring the talents of physicists, radiation biologists, and radiologists.[15] It involves not only scientific but also philosophical consideration. The possible harm that can accrue from radiation must be balanced against its benefits. A wide margin of safety must be provided in setting up standard values of exposure for persons who knowingly and willingly expose themselves to radiation by virtue of occupation. Ethics and morality are factors in the setting of permissible dosage standards for persons who may unknowingly become exposed to radiation in the vicinity of radiation generators or emitters. An even wider safety margin must thus be provided for those individuals.

Physicians have a deep awareness of the application of philosophical principles simultaneously with scientific. Good medicine is both science and art because of this.

On the basis of the previous discussion of radiation effects, it may seem incongruous to speak of a "permissible dose" of radiation. The underlying philosophy for such a concept is the recognition of the harmful nature of radiation, but physicians must be willing to assume certain risks in its use because of its great value. It is a matter of recognizing the possibility of radiation damage while assigning such a wide margin of safety to the allowable exposure that the probability of injury on the basis of our existing knowledge is not great. The concept of permissible dosage is an attempt to strike a hard bargain with radiation.

The initial maximum permissible dose for radiation workers was set at 0.1 r per day in 1934. In 1948, the NCRP, on the basis of newer knowledge, reduced this to 0.3 r per week. Genetic effects then became a factor, and, in 1956, not only was the dose reduced downward but a formula was established to give maximum protection to the exposed population in the reproductive age group.[16]

It should be pointed out that the steady downward revision of the permissible dosage through the years has been accomplished without evidence of discernible injury to individuals under any of these standards.[17] As knowledge of radiation effects has increased, there has always been a corresponding sensitivity of the NCRP to the possibility of harm and a desire to provide as wide a margin of safety as is practicable.

The practitioner has a practical consideration in the above discussion. If he is exposed in any degree to radiation, he should insure himself that the degree of his exposure is within the maximum permissible level. It is his ethical responsibility, also, to see that exposure of employed personnel under his supervision to radiation is within this range. This can be easily and inexpensively done, without any knowledge of the subject, by means of the radiation film badge. This is simply a small badge containing a film of a special type which is worn by the exposed individual at all times when near radiation sources. The film badge service can be secured from a number of commercial concerns. A permanent record of radiation exposure is sent periodically to the physician, and a record is kept in the central file of the concern. This represents a most inexpensive form of insurance against radiation injury for the practitioner and for his employees.

Medicolegal Considerations

Any practitioner who does fluoroscopic or radiographic examinations has, without realizing it, passed imperceptibly into a period of tremendously increased liability due to radiation damage. It does not require a great deal of imagination to foresee the types of malpractice suits that might occur in the future. There will undoubtedly be tests concerning the physician's liability in presumed cases of miscarriage, stillbirth, congenital deformity, or neoplasia linked to relatively low dosage radiation.

The lack of knowledge on the part of the physician relative to radiation hazards will place him in a rather precarious position on the witness stand. Failure to have had radiation equipment surveyed by a qualified physicist, lack of knowledge of dosage factors, and failure to use standard measures of protection will leave him extremely vulnerable for damage claims. Association between radiation and the alleged injury may be on flimsy grounds, but to a jury of laymen impressed by a recital of radiation effects the confession by the practitioner of ignorance of the accepted standards of protection will not go well.

The standards suggested in Handbook 60 of the NCRP [4] have been used in previous years in court testimony. They are applicable to all radiation installations, not only to that of the radiologist. It is these standards which are now being used as the foundation for legislative codes regulating radiation

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in various states.[18] Practitioners with radiation equipment must sooner or later take cognizance of these standards.

As legislation concerning the regulation of radiation exposure becomes more prevalent, the physician will be brought increasingly into contact with areas wherein the possibility of legal suits may occur. If he is to continue the personal use of radiation equipment, he must begin to seek knowledge concerning the use of all recognized safety procedures. The philosophy of licensing radioactive materials by the Atomic Energy Commission has been used since the dissemination of these materials to the medical profession. Unless there is rigorous self-policing by the profession, public pressure may well be generated to a sufficient degree that licensing radiation equipment of all types will be required.

Personal Registration of Radiation Exposure.—The feasibility of keeping a permanent record of the amount of radiation that each person receives has recently been under study.[19] Several systems have been proposed, but each has its own weaknesses and drawbacks.

The basic difficulty is that there is not yet a simple, accurate, and practical method for obtaining a dose to the gonads of both sexes which can be used under all clinical conditions. Without accurate input data, any system of radiation exposure recording is meaningless.

Once methods of securing adequate data are developed, problems concerning the actual recording of the dosage must then be met. The use of personal radiation cards to be carried by the patient is not desirable from the medical viewpoint. It is not only bad psychologically, but the difficulty of patients keeping medical records of any kind is a familiar one to the profession. Further, the use of a central registry for such record keeping would involve considerable administrative difficulties which might well hamper medical practice.

A review of this problem by the International Commission on Radiological Protection and the International Commission on Radiological Units and Measurements for the United Nations Scientific Committee on the Effects of Atomic Radiation declares that, at least for the present, any effort in this direction would be more profitably expended in studying samples of the population to determine gross rates of exposure to radiation and in making estimates of gonadal dose from this.[19]

A Sense of Proportion

Common sense demands that the practitioner view the current lay and scientific alarm about the harmful effects of ionizing radiation with a sense of proportion. The opinion of eminent geneticists and radiation biologists must be respected, but, as physicians, we must place these opinions in their proper context. The hazards of radiation must be regarded with the same cool sense of emotional detachment with which other hazardous procedures in medicine are regarded. The possibility of causing damage to future generations cannot be allowed to interfere with the legitimate use of radiation by medicine as long as a substitute modality is unavailable. There is no reason for the practitioner to feel uneasy about radiation when it is being used with conservative judgment and skill.

The pronouncements of laboratory investigators must be accepted as important contributions to the basic science background of the physician and must be viewed in that perspective. The exercise of judgment concerning the use of hazardous procedures on human beings is a prerequisite in the medical profession. It calls for an evaluation of the degree of danger of the hazard versus the net gain to the patient. Neither the layman nor the nonmedical scientist can make this judgment. This fact must be recognized by scientists outside of the medical field, and it must be made clear to the lay public. The primary need is for education, not for alarm. With an increased dissemination of knowledge concerning radiation, those to whom this subject is relatively new will learn, as those of us who work with radiation have learned, to respect and not to fear it.

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ELECTROCARDIOGRAM AND ELECTROENCEPHALOGRAM IN ELECTIVE CARDIAC ARREST

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The information afforded by continuous electrocardiographic and electroencephalographic monitoring is especially valuable during cardiac surgery. An abnormality seen in the electroencephalogram represents a summation of many influences affecting the brain and is not specific, but it tells when something is occurring that should be investigated. The promptness with which such changes follow a circulatory disturbance is illustrated by seven records made during operations in which the heart was arrested by injections of potassium citrate. The electrocardiogram showed the disorganization, cessation, and later resumption of cardiac activity; the electroencephalogram reflected the level of anesthesia, the effect of temperature changes, the state of the cerebral circulation, and the adequacy of respiration. These means help to maintain the necessary close rapport between the anesthetist and the essential physiological functions of the patient.

Safety during anesthesia demands close rapport between the anesthetist and the essential physiological functions of the patient. The development and use of detailed signs of anesthesia have helped to establish this rapport. These signs, including respiration, pulse, blood pressure, motility of the eyeball, and size of the pupil, are useful in determining the depth and, therefore, the safety of anesthesia. These signs of anesthesia must be considered as aids only, and assessment of the status of the patient necessitates a thoughtful consideration of all of them. Anesthesia, in many of its present applications, modifies or arrests some of the physiological functions so that they are useless as signs of anesthesia.

Various instruments of precision, such as those which record intra-arterial blood pressure and blood or alveolar oxygen and carbon dioxide tension, and the electrocardiogram and electroencephalogram, have been employed to assist in determining the condition of the patient during the stresses of surgery and anesthesia. Of these, the electrocardiogram and the electroencephalogram may prove to be most useful.

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Electrocardiogram

An electrocardiogram is most helpful in patients with already existing heart disease, whether or not the heart is the site of the surgical procedure.

It affords immediate evidence of cardiac arrythmias, the most serious of which are those resulting from high vagal tone or ventricular irritability. High vagal tone is the cause of nodal rhythm, atrioventricular dissociation, Wenckebach's period, sinus bradycardia, and ventricular asystole. Ventricular irritability may produce premature ventricular contractions (especially significant is the multifocal premature ventricular contraction in which the configuration of the complex varies from beat to beat), ventricular tachycardia, and ventricular fibrillation. The latter two may result from a compromise of coronary circulation during surgery (such as the inadvertent placing of a suture around or too near a coronary orifice). The intravenous injection of procaine, the interruption of surgical manipulation of the heart, or relief from a sharply jackknifed position may correct ventricular tachycardia.

Anoxia, especially in the diseased heart, may cause depression at the S-T deflection in the electrocardiogram. There are, however, no changes in conduction. T-wave changes are seen not in acute but only in chronic anoxia. S-T elevation (or depression in subendocardial infarcts) occurs immediately with coronary occlusion, but Q-R-S changes (significant of necrosis) occur only after an interval of several hours. During elective cardiac arrest, the electrocardiogram shows only a flat horizontal tracing.

Electroencephalogram

The electroencephalograph registers or records the electrical waves which are produced by the brain. The energy output of the brain is revealed by the amplitude and frequency of the tracing and is seen to decrease with deeper anesthesia, hypoxia, hypotension, hypothermia, and hypercapnia. The electroencephalogram summates these effects without clearly indicating which is responsible for the deviation from normal. The changes which are seen during surgery and anesthesia are not, therefore, specific but indicate the necessity for careful evaluation of pulmonary ventilation, blood pressure, and the like. In this respect, abnormalities of the electroencephalogram are somewhat similar to those of blood pressure—the changes indicate only that something is occurring which should be investigated. The appearance of hypertension, for example, may be the result of some such factor as mild hypoxia, hypercapnia, or a painful stimulus during light anesthesia. The changes in the encephalogram resulting from anesthesia with various agents and from anoxia, hypercapnia, hypotension, and hypothermia have been the subjects of many investigations in the past few years.

Gibbs, Gibbs, and Lennox, in 1937,[1] made electroencephalograms of patients under ether anesthesia. They found that, as the depth of anesthesia was increased, there was an increase in the amplitude of frequencies at 20 cps and that later high-voltage waves with a frequency of 5 cps appeared; in anesthesia for surgery, waves of 1 cps, on which were superimposed small waves with 10 to 20 cps. frequency, appeared. They concluded, "A practical application of these observations might be the use of the electroencephalogram as a measure of depth of anesthesia during surgical operation. The anesthetist and surgeon could have before them on tape or screen, a continuous record of the electrical activity of both heart and brain."

The electroencephalogram during ether anesthesia was further studied by Courtin, Bickford, and Faulconer.[2] They recognized seven electroencephalographic levels of anesthesia, which they described, respectively, as flat, rhythmical, complex, slight suppression, moderate suppression, severe suppression, and complete suppression. They found that the great variations between the electroencephalographic patterns of waking patients disappeared even under light anesthesia and that the characteristic tracings for the different levels were reasonably constant from patient to patient. The patterns for ether anesthesia as described by Clowes and others [3] were somewhat similar.

Bellville and Artusio [4] studied the electroencephalograms of patients in the various planes of stage-1 (analgesia) ether anesthesia. Plane 3 of this stage produced a characteristic electroencephalogram. The amplitude was 30-40 μv, the rhythm was sinusoidal, and the frequency was 20-24 cps. Deepening of the anesthesia was followed by the appearance of waves of slower frequencies with a superimposed wave of fast frequency and finally by the disappearance of the fast-frequency wave with a predominance of the slow-frequency waves. The predominant frequency in the stage of analgesia, i. e., plane 3 of stage 1, is 22 cps. The average peak activity is 17 μv (12.5-22 μv).

Nitrous oxide anesthesia was found to give the same electroencephalographic pattern as the lighter stages of ether anesthesia.[4] Six electroencephalogram stages of cyclopropane anesthesia were recorded by Rubin and Freeman.[5] Cyclopropane anesthesia, as shown by the electroencephalogram, was divided into five stages by Possati and others.[6] A close correlation between stages of anesthesia and concentrations of cyclopropane in the blood was found. The effect of thiopental (Pentothal) sodium, given in a dose of 400 mg. prior to intubation, produced extensive changes in the electroencephalogram.[7] High amplitude waves of 1 to 2 cps appeared for a period of one-half to one minute, followed by disappearance of the rhythm. Later the pattern showed waves of 2 to 3 cps alternating with zones of extinction, each having a duration of 5 to 10 seconds. These abnormalities lasted from one and one-half to eight minutes and were not found with slow injection of thiopental.

Courtin [8] described the electroencephalographic levels of anesthesia with nitrous oxide and trichlorethylene and found them strikingly similar to levels

1, 2 and 3 of anesthesia with nitrous oxide and ether.[7] Level 1 with waves of fast frequencies was characterized by an increase in frequency and a decrease in amplitude from the normal tracing. Level 2 (rhythmical) showed an amplitude of 1 to 200 μv with a predominant frequency of 3 to 5 cps. Level 3 (complex) was characterized by a loss of rhythmicality but a persistence of an amplitude of up to 200 μv with relatively slow-frequency waves. No significant changes in the electroencephalogram were found with the use of usual doses of morphine, meperidine (Pethidine), and the muscle relaxants.[8]

Fig. 1—Electroencephalogram and electrocardiogram in elective cardiac arrest after injection of potassium citrate into coronary circulation.

Anoxia may cause electroencephalographic signs similar to those produced by anesthesia. In one patient with a history of coronary infarction before the anesthetic was given, the electroencephalogram suggested deep anesthesia and the electrocardiogram showed evidence of myocardial anoxia.[9] The operation was delayed for one week, the hemoglobin level was increased from 11.5 to 15 Gm. by transfusions, and the operation was then carried out without incident.

On sudden cessation of blood flow to the brain, changes in the electroencephalogram appear immediately even though oxygenation has been adequate up to this point. This was exemplified by a case in which herniation of the heart from its pericardial sac occurred.[10] There was a sudden change from the normal rhythm (which was rapid frequency at low voltage) to waves of 3 to 4 cps with an amplitude of 150 μv. The previous normal rhythm was restored when the heart was returned to the pericardial sac. The herniation had caused immediate blockage of the great vessels of the heart with an instantaneous cessation of blood flow to the brain. (It might be presumed that this instantaneous effect is owing to anoxia rather than to hypercapnia of the brain.)

In another study, as carbon dioxide was added to the anesthetic mixture respiration was temporarily stimulated and a transient rise in blood pressure resulted.[3] Depression followed in 75% of the experiments and was accompanied by a moderate hypotension. The level of anesthesia, when 3, 4, or 5 and with ether or pentobarbital (Nembutal), deepened when carbon dioxide was administered without an increase in the concentration of the anesthetic agent in the blood. The same results were seen in eight patients under ether anesthesia when a rise in the serum carbon dioxide level occurred. A rise in pCO_2 from 46 to 72 mm. Hg was seen in one patient while the blood ether level remained constant (102 mg. per 100 cc.). The electroencephalogram showed a change from a type 3 to a type 4 pattern. This gave a tracing similar to that shown when the blood ether level was 125 mg. per 100 cc. with normal pCO_2. In types 1 or 2, hypercapnia acted as a stimulant without showing evidence of cortical depression. Findings in 17 patients showed that in the presence of high carbon dioxide blood levels less ether was needed to cause cortical depression, as indicated in the electroencephalogram. In the case of pentobarbital anesthesia with normal pCO_2, electroencephalogram changes with decreased oxygen saturation were slight until a level of 40% saturation was reached. Below this level, electroencephalographic changes suggested a rapid cortical depression. Another study also showed that the presence of excess carbon dioxide in the blood hastens deepening of anesthesia.[5] Other workers[2] have detected no change when carbon

Fig. 2.—Electroencephalogram and electrocardiogram in elective cardiac arrest with restoration of normal cardiac rhythm.

dioxide is added to the inhaled mixture (the concentration was not stated).

The effect of a fall in blood pressure on the electroencephalogram was studied by Beecher and others.[11] Reduction of the blood pressure by controlled cardiac tamponade produced changes during

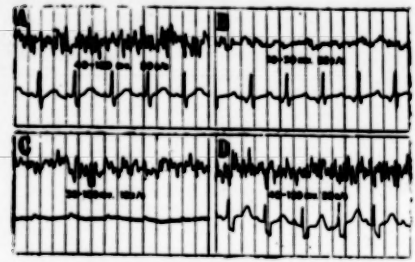

Fig. 3.—Electroencephalogram and electrocardiogram of 4½-year-old child with intraventricular septal defect and pulmonary hypertension, showing effect of moderate hypothermia on electroencephalogram. Child's temperature was *A*, 36 C; *B*, 31.5 C; *C*, 33 C; *D*, 34 C.

stabilized ether (and also stabilized pentobarbital) anesthesia which could not be distinguished from the changes resulting from deepening the anesthesia.

Hypotension induced by trimethaphan (Arfonad) camphorsulfonate was found to cause transient flattening of the electroencephalogram.[12] The more rapid the fall in blood pressure, the greater was the depression. If the systolic pressure was lowered no more than 10 mm. Hg per minute, pressures of 40 mm. Hg could be reached and maintained for periods of as long as one hour.

The carotid sinus, when distended, causes a progressive reduction in cortical activity, as shown by the appearance of slow waves on the electroencephalogram.[13] It is thought to be independent of blood pressure changes, inasmuch as it persists after bilateral vagotomy and high spinal section, which interfere with the hypotensive response to carotid sinus distention. This is considered to be the first example of an afferent inflow which "damps" rather than activates the cortex.

The effects of hypothermia were studied in monkeys.[14] Progressive depression of the electroencephalogram accompanied a fall in body temperature until, at 20 C (68 F), there was no evidence of cortical activity. When rewarming occurred, the electroencephalogram gradually resumed its normal form.

Changes During Elective Cardiac Arrest

The changes in the electrocardiogram and electroencephalogram as described above are illustrated in the following examples. All the patients in this series were subjected to elective cardiac arrest by injecting potassium citrate into the coronary circulation.[15]

Injection of Potassium Citrate into Coronary Circulation.—The electrocardiogram is normal before the injection of potassium citrate. The disintegration of the complexes follows and leads to a horizontal line, indicating absence of all activity (fig. 1). After removal of the aortic clamp at the end of the operation (fig. 2), small ventricular contractions appear, and, in a few minutes, a normal rhythm returns. The electroencephalogram meanwhile shows no significant changes.

Effect of Temperature.—A 4½-year-old patient, operated on for intraventricular septal defect and pulmonary hypertension, showed electroencephalographic changes due to temperature changes (fig. 3). The normal electroencephalogram when the patient's temperature was 36 C (97 F) was followed by evidence of depression (from 40 to 120 μv at 20 cps to 10 to 30 μv at 22 cps) when the temperature fell to 31.5 C (88.7 F) five minutes later. The lowering of body temperature resulted from the infusion of cool blood from the pump oxygenator. Return to a normal pattern (40-120 μv at 20 cps) followed restoration of temperature. An electroencephalogram showing a change of this sort on cooling may revert to normal even without a rise in body temperature as the brain becomes ac-

Fig. 4.—Tracings from 11-year-old child with aortic stenosis, showing effect of hypercapnia on electroencephalogram. Child's pCO_2 was, *A*, 52 mm. Hg; *C*, 82; *D*, 82; *E*, 52; *F*, 40.

customed to the change. P waves occasionally persist during elective cardiac arrest.

Hypercapnia.—An 11-year-old patient, operated on for aortic stenosis, showed the effect of hypercapnia on the electroencephalographic tracing (fig. 4). A depression of the electroencephalogram (from 50 to 130 μv at 22 cps to 10 to 50 μv at 9 cps)

accompanied a rise in venous pCO_2 from 52 to 82 mm. Hg. An improvement in the pattern resulted after a return of pCO_2 to 40 mm. Hg.

Irreversible Anoxia Due to Surgical Technical Difficulties (Fig. 5).—During an operation on a 27-year-old patient with mitral insufficency a dissecting aneurysm appeared. The electroencephalotracing followed the appearance of a dissecting aneurysm, which, beginning where the stream of blood from the pump struck the wall of the aorta, extended toward the heart, obstructing the aorta and cutting off all bood flow to the brain. The aneurysm then burst into the ascending aorta, restoring at least partially a blood supply to the brain. A flattened pattern resulted from application of a clamp to the ascending aorta preparatory to arresting the heart by the injection of potassium. This clamp obstructed the outlet of the aneurysm, and thus the brain circulation was again cut off. A second rupture of the aneurysm into the descending aorta restored once again the cerebral blood supply with a return of a fairly satisfactory electroencephalographic pattern. The patient survived the operation but died two days later due to coronary occlusion.

Fig. 5.—Tracings from 27-year-old patient with mitral insufficiency, showing irreversible anoxia (*E*) due to surgical technical difficulties.

Anoxia.—In a 2-year-old patient with Tetralogy of Fallot and cyanosis the sequence of patterns showed a change which improved when ventilation was achieved by use of pure oxygen (fig. 7). The change cannot be attributed to anoxia but rather shows the need for close scrutiny of all possibilities.

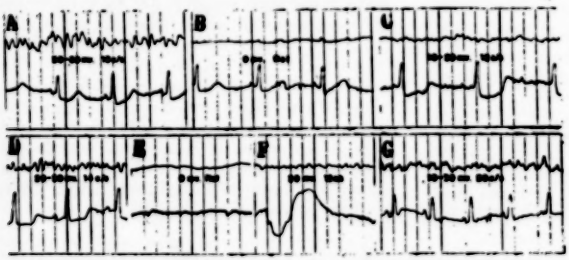

Fig. 6.—Tracings from 53-year-old man with aortic stenosis. Dissecting aneurysm caused cerebral anoxia which produced electroencephalographic changes seen at *B* and *E*.

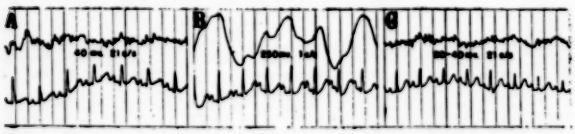

Fig. 7.—Tracings from 2-year-old child with tetralogy of Fallot with cyanosis. Evidence of cerebral depression shown at *B* improved on administration of 100% oxygen.

Summary

The electrocardiograms and electroencephalogram are helpful monitors in the management of patients undergoing cardiotomy. The electrocardiogram reveals valuable information of cardiac arrhythmias, many of which respond to appropriate therapy. Little evidence is afforded on anoxia and hypercapnia, however.

The electroencephalogram is useful as an indicator of cerebral oxygenation during elective cardiac arrest when most of the signs of anesthesia fail. The depression of the cortical output results from hypotension, decreased blood flow, hypothermia, and also cerebral anoxia. Depression also accompanies anesthesia, hypercarbia, and stimulation of the carotid body.

Many factors produce changes in the electroencephalogram, none of which is specific. These graphic pattern showing bursts of activity separated by flat horizontal tracing was indicative of serious (usually fatal) cerebral anoxia (fig. 5).

Dissecting Aneurysm (Fig. 6).—In a 53-year-old patient, operated on for aortic stenosis, a satisfactory electroencephalogram was recorded after the pump oxygenator had been started. A nearly flat

changes, when they are seen, are a clear indication for the careful investigation of all possible causes of cerebral depression.

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ELECTIVE CARDIAC ARREST.—The initial report by Melrose and associates on laboratory observations of elective cardiac arrest was published in July, 1955. This team of English workers recognized the importance of a dry motionless field in the development of open-heart surgery. Their approach, based on the early work reported by Ringer, in 1883, and Hooker, in 1929, was further stimulated by the more recent publications of Montgomery, Prevedel, and Swan. Melrose and co-workers developed a simple technique using a potassium citrate-blood mixture for inducing elective cardiac arrest in dogs. Although they did not report clinical application, their concept of elective cardiac arrest and the simplicity of their method had particular appeal to us. The decision to employ this technique at the Cleveland Clinic was made after an intensive experimental trial. On Feb. 17, 1956, the Melrose technique of elective cardiac arrest was utilized in the closure of an interventricular septal defect. The patient, a 17-month-old child, is thought to be the first clinical case in which elective cardiac arrest was successfully employed. Since the initial operation, elective cardiac arrest has been utilized by the authors in 73 operations; a total of 84 open cardiotomy procedures have been performed with the aid of pump-oxygenators. Cardiac arrest has been employed in operations for closure of septal defects at the auricular and ventricular levels, correction of mitral and tricuspid insufficiency, aortic valvular commissurotomy, correction of pulmonic valvular and infundibular stenosis, and in attempts to correct transpositions of the great vessels. On the basis of this experience, a preliminary conclusion is justified, namely: the safety and the benefits provided by the Melrose technique for elective cardiac arrest justify its use in surgery on the open heart.—D. B. Effler, M.D., L. K. Groves, M.D., F. M. Sones Jr., M.D., H. F. Knight Jr., M.D., and W. J. Kolff, M.D., Elective Cardiac Arrest—An Adjunct to Open-Heart Surgery, *The Journal of Thoracic Surgery*, October, 1957.

HYPOVENTILATION AND HYPERVENTILATION DURING ANESTHESIA FOR THORACIC SURGERY

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It is especially necessary to guard against the development of hypercapnia and hypoxia in the patient during thoracic surgery because so many factors may combine to interfere with pulmonary ventilation. It is especially difficult to judge the depth of anesthesia and adequacy of gas exchange when spontaneous respiration is replaced by controlled respiration. The possible advantages of deliberate hyperventilation were explored in 128 patients undergoing thoracic surgery. In most of them ventilation was achieved by manual compression of the reservoir bag, but in about 20 patients mechanical respirators were used. Samples of arterial blood were obtained for determinations of pH, pCO_2, and oxygen saturation. Four case histories are given showing the possibility of maintaining normal acid-base balance or producing an alkalosis in this way, and illustrating the inadequacy of spontaneous respiration in some cases. There was no evidence that the methods of artificial respiration used hindered the return of venous blood to the heart. Excessive depth of anesthesia was avoided by using concentrations and quantities of anesthetics such that it was virtually impossible for deep planes of anesthesia to be attained. No ill-effects attributable to alkalosis were seen even in patients maintained in that state for several hours. The results indicate that an extensive evaluation of the relative merits of respiratory acidosis and alkalosis is desirable.

The aim at all times during anesthesia is to provide adequate alveolar ventilation so that oxygen may be supplied to the tissues in adequate concentrations and carbon dioxide eliminated in proper amounts. During thoracic surgery several factors, acting singly or in combination, may interfere with normal ventilation. The common denominator of these several forces is the diminution of gaseous exchange at the alveolar membrane.

Precipitating causes of hypercapnia and, in many instances, hypoxia include the following: 1. Drugs employed during general anesthesia. Nearly all such agents either depress the respiratory center directly or prevent normal transmission of impulses from the center to the muscles of respiration. Due to these effects, the anesthetized patient is incapable of reacting to the stimuli normally initiated by hypercapnia. 2. Technical anesthetic difficulties. Upper respiratory obstruction or laryngospasm during induction, difficulty in the insertion of an endotracheal tube, the placement of a tube beyond the carina into the right main bronchus, and the overzealous inflation of an endotracheal cuff may interfere with gaseous exchange. 3. Posture of the patient. During anesthesia any position which interferes with the expansion of the thoracic cage will diminish respiratory exchange. In this category the heavy arm of the surgical assistant leaning on the patient's chest must not be forgotten. 4. Disease within the lung parenchyma. In most thoracic operations normal alveolar ventilation is compromised by disease processes in a portion of the lung. 5. Altered pulmonary mechanics associated with an open thorax. 6. Surgical manipulations within the thoracic cavity. Partial collapse of a lung, necessary in the performance of surgery, may allow the perfusion of blood but will prevent exchange of gases because of alveolar collapse. The situation might be likened to that present with an arteriovenous shunt. 7. Method of respiratory exchange permitted or initiated by the anesthesiologist. This factor is one in which a relatively wide range of variability exists.

These etiological mechanisms have been well documented within the last few years and exist as real entities in day-to-day practice.[1] There is unanimity of opinion that respiratory acidosis is the result of inadequate alveolar ventilation. As a corollary, it is agreed that respiratory acidosis should be prevented in the best interests of the patient.

In clinical practice difficulty has arisen in preventing respiratory acidosis and hypoxia because there are no clear-cut signs to indicate their presence. Cyanosis is not apparent until the arterial oxygen saturation diminishes to 75 or 70% of normal, and the signs of hypercapnia are masked by the state of anesthesia. Assisting respiration by manual compression of the reservoir bag of the gas machine during the inspiratory phase is practiced

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widely, but it is realized that such augmentation of ventilation, even when performed by an "educated" hand, often fails to prevent acidosis. Within recent years attempts have been made to fill the breach by utilizing mechanical ventilators.[2] For best performance these ventilators require the complete abolition of spontaneous respiration. They "control" the respirations of the patient.

Although recommended sporadically for a number of years, controlled respiration has not been received with enthusiasm in all centers. However, in 1952,[3] it was suggested that, if normal acid-base balance is to be maintained with modern anesthetic techniques which incorporate muscle-relaxant drugs, controlled respiration is necessary. Furthermore, with the peculiar conditions associated with thoracic surgery, it has been indicated that "adequate" ventilation implies a respiratory exchange greater than that necessary in the conscious resting state.[11] Therefore, hyperventilation might be required to maintain a normal acid-base balance.

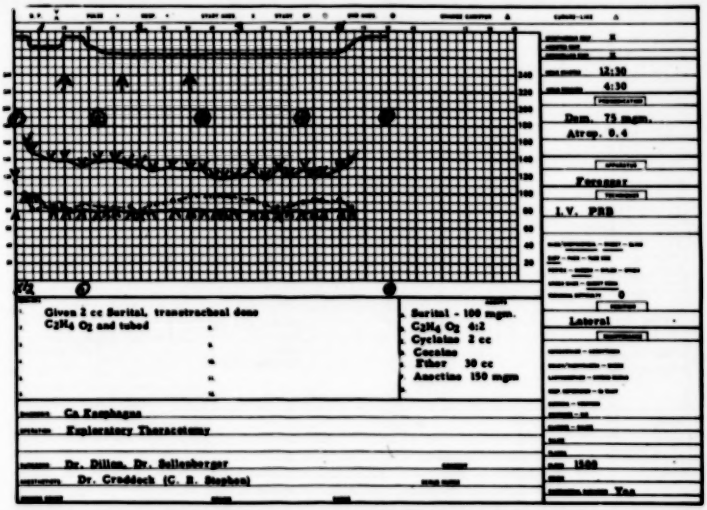

Fig. 1 (case 1).—Anesthetic record for patient who underwent exploratory thoracotomy for nonresectable carcinoma of esophagus. Description of circled numbers appears in table 1.

Methods

An effort has been made to study clinically the effects of hyperventilation in 128 patients in whom thoracic surgery was done. Spontaneous respiration was prevented during operation by the use of drugs and by conscious attempts to provide a greater than normal ventilation. In the majority of patients, ventilation was achieved by manual compression of the reservoir bag, although in about 20 the Jefferson and Stephenson ventilators were used. A variety of anesthetics were employed, including nitrous oxide, ethylene, ether, cyclopropane, fluothane, thiamylal (Surital) sodium, thiopental (Pentothal) sodium, hexobarbital (Evipal) sodium, meperidine hydrochloride, and hydroxydione (Viadril). Succinylcholine chloride was the principal muscle-relaxant utilized to aid in controlling respiration. A partial rebreathing technique, employing flows of gas between 3 and 7 liters per minute, was preferred. Both poor-risk and good-risk patients were included in the series. Respiration was controlled in a regular and rhythmic fashion; the inspiratory phase occupied one-third of the respiratory cycle, and the remainder was occupied by passive expiration and a pause. In the patients for whom mechanical ventilation was done, a one-to-one ratio was believed feasible because of the negative pressure exerted during the expiratory phase. By such regulation of respiration, interference with cardiac output was considered minimal.

In these patients, Cournand arterial needles were placed in either the radial or the brachial artery and samples of blood were drawn into heparinized, oiled syringes at regular intervals. The syringes were iced immediately, and the pH was determined within 10 minutes, with appropriate corrections for

temperature. The carbon dioxide tension was calculated from the carbon dioxide content in volumes per cent, and the pH was determined by use of the nomogram of Peters and Van Slyke (Henderson-Hasselbach equation). Arterial oxygen saturations were determined in a Wood cuvette oximeter. The several anesthesiologists, usually residents, participating in this study were not informed of the results during the procedure, but it was believed that the sampling procedure did enhance their efforts to produce hyperventilation in the patients.

Results

The over-all results show that 80 patients (62.5%) were maintained in a state of relative alkalosis for the greater part of the operation. In 44 patients (34.4%) a normal acid-base balance was held, and 4 (3.1%) showed objective evidence of acidosis during the operation. Some of the findings encountered during surgery are illustrated best by the following case reports.

Case 1.—A 72-year-old female was emaciated and emphysematous; she had lost 60 lb. (30 kg.) of weight during the six months before operation. Physical examination, barium swallow, and esophagoscopy indicated a probable carcinoma of the esophagus. An exploratory thoracotomy was scheduled. Figure 1 and table 1 show the anesthetic record and arterial blood findings during operation. Anesthesia was induced with thiamylal and maintained with ethylene and oxygen, 4:2 liters per minute, along with traces of ether. A dilute succinylcholine drip (0.1%) aided in maintaining controlled respiration.

After 30 minutes of spontaneous respiration in the lateral position, prior to the opening being made in the pleural cavity, this patient showed respiratory acidosis. With institution of manually controlled respiration, alkalosis developed. In older patients with moderate emphysema, this condition is maintained easily and with minimal utilization of drugs. Normal acid-base balance was reestablished readily at the end of operation.

Table 1.—*Findings in Thoracotomy for Carcinoma of Esophagus**

	Time	pH	pCO_2	O_2 Sat. %	
1.	12:30	7.39	37.8	97	Control—awake
2.	1:35	7.31	66.0	98	Spon. resp. 30 min.
3.	2:40	7.62	20.4	90	Controlled resp. exploring
4.	3:40	7.63	17.7	99	Controlled resp. closing
5.	4:30	7.37	39.8	99	End of case

* Description of code for figure 1.

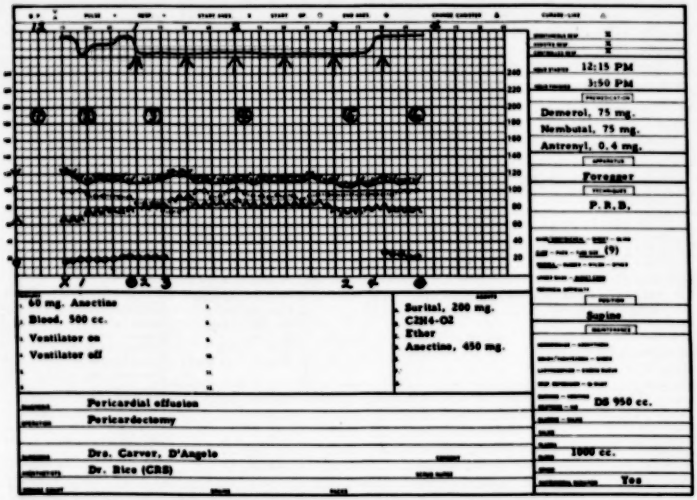

Fig. 2 (case 2).—Anesthetic record for patient who underwent pericardiectomy for massive pericardial effusion. Description of circled numbers appears in table 2.

Case 2.—A 27-year-old female had suffered from pain in the chest for one month. Physical examination, roentgenographic evidence, and pericardial tap indicated a massive pericardial effusion of undetermined etiology. At operation a pericardiectomy was performed. Figure 2 and table 2 show the anesthetic record and laboratory findings. Anesthesia was induced with thiamylal and maintained with ethylene and oxygen, 4:2 liters per minute, with ether added as required. A succinylcholine drip (0.1%) aided in preventing spontaneous respirations.

In this patient a moderate degree of alkalosis was maintained with manually controlled respiration. The institution of mechanical ventilation, with the

Jefferson ventilator used in a one-to-one phase with a positive pressure of 15 cm. H_2O and a negative pressure of 5 cm. H_2O, produced a more marked alkalosis. An acid-base balance approaching normal was evident at the conclusion of operation. This case is of interest in that the institution of vigorous controlled respiration did not apparently interfere with cardiovascular dynamics in a situation where normal cardiac output probably was compromised by the pericardial effusion.

TABLE 2 *(Case 2).—Findings in Pericardiectomy for Massive Pericardial Effusion**

	Time	pH.	pCO_2	O_2 Sat. %	
1.	12:00	7.45	37.4	98	Control awake
2.	12:30	7.51	32.9	99	Just after intubation, controlled
3.	1:10	7.52	30.3	99	Controlled
4.	2:05	7.67	15.6	100	On Jefferson 45 mh.
5.	3:10	7.71	12.6	99	Still on Jefferson
6.	3:50	7.47	31.3	100	Spont. resp., awake, extubated

* Description of code for figure 2.

TABLE 3 *(Case 3).—Findings in Thoracotomy for Bronchiectasis**

	Time	pH.	pCO_2	O_2 Sat. %	
1.	2:20	7.39	43.4	97	Induction just begun, spon. resp.
2.	2:40	7.35	48.8	100	Controlled resp., extrapleural
3.	3:30	7.36	43.2	100	Controlled resp., in chest
4.	4:30	7.37	43.0	98	Controlled
5.	5:30	7.37	40.7	100	Controlled
6.	7:30	7.33	52.8	73	Extubated, spon. resp., awake

* Description of code for figure 3.

necessitated frequent aspiration. Figure 3 and table 3 show the anesthetic course and blood findings. Anesthesia was induced with thiamylal and maintained with cyclopropane and oxygen, with use of a closed-circuit system. A succinylcholine drip (0.1%) assisted in maintaining controlled respiration.

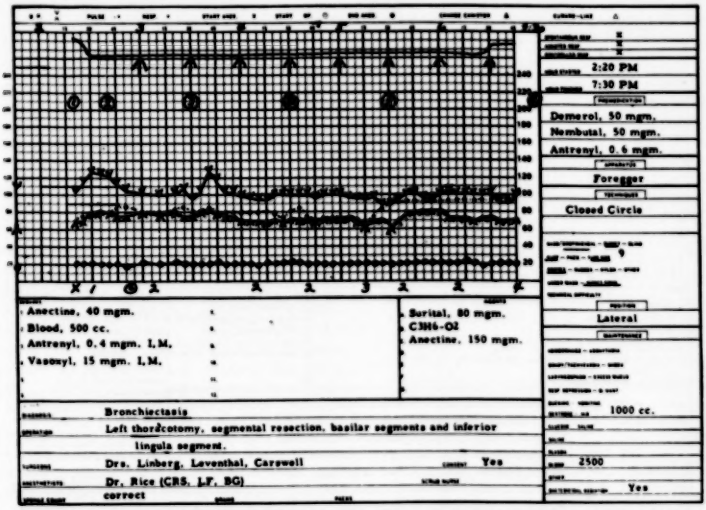

Fig. 3 (case 3).—Anesthetic record for patient who underwent thoracotomy for severe bronchiectasis. Description of circled numbers appears in table 3.

CASE 3.—A 31-year-old female, weighing 95 lb. (47.5 kg.), had extensive bilateral bronchiectasis. She coughed up 6-12 oz. of sputum per day. Her maximum breathing capacity was 44% of normal, and her pulmonary washout time was 15 minutes (normal 4-6 minutes). Moderate air-trapping and emphysema were present. After suitable preparation, a thoracotomy on the left was performed with segmental resections of the basilar segments of the left lower lobe and the inferior lingular segment of the left upper lobe. Secretions were abundant during operation and

This patient had advanced pulmonary disease which prevented normal alveolar ventilation. The margin of reserve was critical. Manually controlled ventilation served to maintain a normal acid-base balance during operation. Abundant amounts of oxygen in the anesthetic mixture prevented hypoxia. However, at the conclusion of surgery, when spontaneous respirations had been established and the patient was able to answer questions, a moderate respiratory acidosis was present, associated with definite hypoxia. The early postoperative course of patients with severe pulmonary disease must be watched carefully.

Case 4.—A 58-year-old male had suffered from acute shortness of breath on several occasions in the last four years. He was known to have severe asthma and had had spontaneous pneumothorax two or three times. On this hospital admission, he again had a pneumothorax which failed to respond to conservative measures. His vital capacity was 36.4% of normal, and his maximum breathing capacity was 27.6% of normal. The pulmonary washout time was 17 minutes. The diagnosis was severe asthma and emphysema, with restricted total capacity consistent with pneumothorax. A thoracotomy was performed, and the air leaks in the lung were oversewn. Figure 4 and table 4 show the anesthetic record and the arterial blood findings. Anesthesia was induced with hexobarbital and maintained with ethylene and oxygen, 4:2 liters per minute, with traces of ether. Succinylcholine in a dilute drip (0.1%) aided in controlling respiration after the lung was exposed.

Table 4 *(Case 4).—Thoracotomy for Spontaneous Pneumothorax**

	Time	pH	pCO_2	O_2 Sat. %	
1.	9:25	7.20	74.5	60	Spon. resp. C_2H_4, ether ind. 30 min.
2.	9:30	7.18	78.1	66	Intubation, expiratory spasm
3.	10:20	7.23	69.8	95	Spon. resp., in chest wall
4.	10:35	7.33	48.1	98	In chest controlled resp. 10 min.
5.	11:20	7.54	46.2	96	Controlled resp.
6.	12:30	7.39	66.9	97	End of case, spon. resp.

* Description of code for figure 4.

This case illustrates one of the more difficult problems encountered in production of anesthesia. The preoperative findings and the arterial blood studies indicated that adequate alveolar ventilation was difficult to attain. With the patient under anesthesia, one hesitated to apply positive pressure to the airway until the thoracic cavity was open for fear of creating a tension pneumothorax and complicating the issue still more. The first three arterial blood samples revealed that spontaneous respiration in this patient induced a moderately severe respiratory acidosis associated with severe hypoxia. The institution of controlled respiration, with expansion of the collapsed lung, improved the situation but failed to correct the respiratory acidosis entirely. The reestablishment of spontaneous respiration at the conclusion of operation again created a respiratory acidosis.

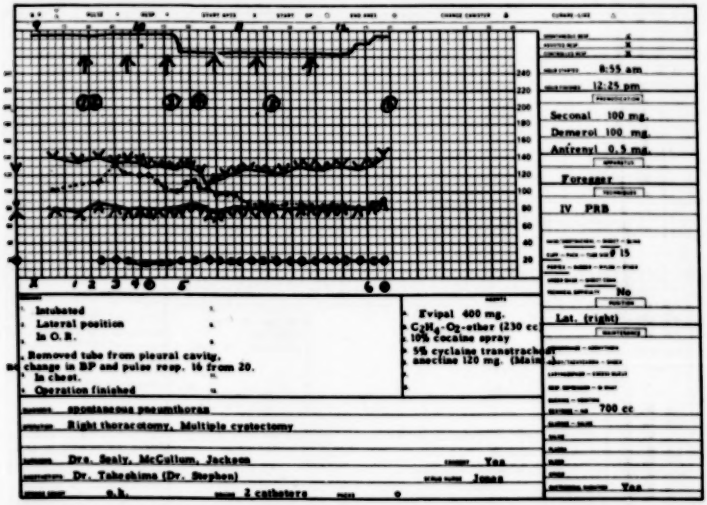

Fig. 4 (case 4).—Anesthetic record for patient who underwent thoracotomy for spontaneous pneumothorax. Description of circled numbers appears in table 4.

Comment

It seems apparent from this study that, in a majority of patients undergoing thoracic surgery, a state of alkalosis or a normal range of acid-base balance may be obtained by employing controlled respiration with a conscious effort to achieve hyperventilation. This method may therefore serve as a technique to avoid undesirable respiratory acidosis. However, certain objections arise concerning potential dangers associated with this technique. These hazards may be considered under three headings.

First, the possibility exists that controlled respiration, altering respiratory dynamics as it does, may interfere with venous return and cardiac output. If performed improperly, such may be the case.[4] On the other hand, if intermittent-positive-pressure breathing provides a pressure curve at the mouth that shows (1) a gradual increase in pressure during inspiration, (2) a rapid drop in pressure at the beginning of exhalation, (3) a mean pressure during the expiratory phase as near atmospheric as possible, and (4) an expiratory time exceeding the inspiratory time, there will be minimal disturbance to circulation.[5] In the present study, the blood pressure and pulse records during anesthesia showed minimal evidence of alteration in cardiovascular dynamics. In any given instance, hypotension could be produced temporarily by application of repeated high inspiratory pressures with minimal pauses between inspirations. Controlled respiration should be instituted with caution in patients suffering from shock or having greatly decreased blood volume. In these patients hypotension may occur with the recommended technique because the reflex increase in peripheral venous pressure normally initiated is impaired.[6] The use of a negative pressure during the expiratory phase is recommended in such instances.

Second, during controlled respiration one of the most important signs of depth of anesthesia, the type of spontaneous respiration, is lost. How can one determine the plane of anesthesia during controlled respiration? In the absence of electroencephalographic monitoring, the answer to this question is not simple. One could say that herein lies the "art" of anesthesiology. More to the point, perhaps, is the adoption of a concept that under these conditions anesthetics should be employed in such concentrations and quantities that it is virtually impossible for deep planes of anesthesia to be attained. When potent inhalation drugs, such as ether, are being used, the risk of deep planes of anesthesia or overdosage is reduced greatly if partial rebreathing techniques with high flows of gases (3-7 liters per minute) are adopted. The judicious use of muscle-relaxant drugs to provide relaxation when needed or to aid in controlling respiration is often an important adjunct. A proper pharmacological balance relies not too much on anesthetics and not too much on relaxant compounds. The total dose of any injectable agent must be limited by judgment and experience.

Finally, if controlled respiration results in hyperventilation, with the production of alkalosis, does this alteration in acid-base balance increase the over-all risk to the patient? The answer to this question at present is unknown. Rapoport and others[7] have indicated that the only consistent change in the electrolyte structure of arterial blood associated with overbreathing in man is the rapid decrease in carbon dioxide tension associated with an increase in pH.

Physiological changes have been shown to occur with alkalosis. In dogs, a shift of pH from 7.35 to 7.70 will reduce coronary flow by 50%.[8] This apparent constriction of the coronary vessels results in a myocardial hypoxemia. Kety and Schmidt[9] showed that in man in a conscious state a similar shift of pH from 7.38 to 7.54 decreased cerebral blood flow by 36% and increased cerebral vascular resistance from 1.6 to 3.1 units. It is known that decreased carbon dioxide tension is the strongest cerebral vasoconstrictor yet demonstrated. However, the vasoconstrictor influence is actually the intrinsic tone of the vessels themselves, and the exciting agent is removal of the normal vasodilating tendency of carbon dioxide.

In this regard it is interesting to note that thiopental depresses the intrinsic tone of the cerebral vessels. In experiments on man, the cerebral metabolic requirements were reduced by 40% while the cerebral vascular resistance was reduced by 20%.[10] Thus, under the influence of an anesthetic the normal cerebral adjustment appears to break down. Whether the influence of anesthesia would tend to compensate for the changes produced by alkalosis remains to be shown.

In this study in which respiratory alkalosis was induced in 80 patients, sometimes for several hours, no ill-effects were noted clinically either during or after operation. Almost invariably the acid-base balance returned easily to normal levels at the conclusion of surgery. Patients awakened quickly and were well oriented.

A word must be said in support of the impression that controlled respiration, and presumably hyperventilation with alkalosis, contributes in and of itself to the state of narcosis.[11] If by use of this technique the amounts of anesthetics required by the patient can be reduced, a certain advantage is achieved. Perhaps more potential harm than good is the ultimate result, but this fact has yet to be proved.

Summary

Prevalent opinion indicates that respiratory acidosis, although produced easily in thoracic surgery, is potentially harmful and to be avoided if possible. The ideal of preservation of normal acid-base balance is difficult to achieve clinically. A group of 128 patients were maintained on controlled respiration, and a purposeful effort was made to produce hyperventilation during operation. Eighty of these patients developed a state of respiratory alkalosis. Although the clinical progress of these patients was

satisfactory during and after operation, it remains to be shown whether a state of alkalosis is more or less desirable than a state of acidosis.

Box 3535 (Dr. Stephen).

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POSSIBLE CHANGES IN PRACTICE OF RADIOLOGY.—The year 1958 is likely to see changes, too, in the practice of radiology. It is expected that the Adrian Committee will shortly commence, in selected hospitals, its survey of the dose to the patient in diagnostic radiology and the results will ultimately permit a more accurate assessment of the amount of radiation reaching the reproductive organs of the people of this country from diagnostic radiology, an amount which was estimated in the M. R. C. report on "The Hazards to Man of Nuclear and Allied Radiations" as being 22 per cent of that derived from natural sources. If this figure proves to be much too small, some further limitations in the use of diagnostic X rays may be anticipated. In the field of radiotherapy the process of replacement of radium by X rays is likely to be accelerated now that it is possible to achieve a similar type of high-energy gamma radiation. After several clinical trials, supervoltage X-ray therapy is established as a valuable method of treating malignant disease, and providing the proper control is ensured, there is no reason why such apparatus should not be installed in every deep-therapy centre where it is likely in the foreseeable future to replace orthodox irradiation for most deep-seated neoplasms suitable for radiation treatment. Radium beam units in their turn seem likely to be superseded by apparatus using radioactive cobalt and possibly caesium, and in other applications isotopes are already performing some of the work previously done by radium. Further advances, however, may well depend on quite different considerations, such as better selection of cases, the pre-determination by histologists of the radio-sensitivity of individual growths, and a conquering of the technical difficulties inherent in present methods of using our knowledge of the effect of oxygen tension and other factors on radio-sensitivity. Discussions of these and allied subjects will give added interest to the International Cancer Congress to be held in London in July of this year.—Editorial, *The Journal of the Faculty of Radiologists*, January, 1958.

CHELATE IRON THERAPY

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Administration of effective doses of iron in the treatment of iron deficiency anemia is complicated by the fact that iron compounds are not innocuous. Toxicity experiments on dogs and rabbits are here summarized; they showed that the concentration of iron attained in the animal's serum determined the severity of the acute symptoms. Iron in the form of ferrous sulfate or ferrous gluconate raised the serum iron level higher, and caused more intense symptoms of intoxication, than did equivalent doses of iron choline citrate. Presenting the iron to the system as a chelate complex caused less adverse effects than the use of ionized or readily ionizable preparations. Test doses containing 120 mg. of iron were given orally to five volunteer subjects, first as ferrous sulfate solution, then two weeks later as iron choline citrate solution; determinations of serum iron before and after each administration showed that the sulfate caused a higher and less sustained rise in serum iron than did the complex. Given orally in tablet form thrice daily to 131 patients in doses ranging from 120 to 240 mg. of iron per day for a total of 3,303 treatment days, iron choline citrate caused gastrointestinal symptoms in only six patients, and in these it was possible to continue the medication since all symptoms presently disappeared. The clinical responses, both symptomatically and from a laboratory viewpoint, were entirely satisfactory and were comparable to those previously attained from other iron preparations utilized under similar circumstances.

The use of iron extends from its empirical applications in ancient times to the present day in which it is universally recognized as a specific form of therapy for iron deficiency anemia. The more rational use of iron has been brought about by the introduction of better diagnostic tools, a delineation of the different types of anemia, and an increasing knowledge of iron metabolism. However, since several excellent reviews covering these areas have been published in recent years, it is not our intent to discuss them here.

Iron deficiency anemia is one of the most common ailments assailing man. It can be caused by excessive blood loss, inadequate iron intake, defective iron absorption, increased iron requirements, and imperfect utilization of iron. Iron is present in various forms in all tissues and plays an indispensable role in intracellular respiratory processes. This metal is a basic component of hemoglobin, myoglobin, cytochrome, and the enzymes, catalase and peroxidase. In all of these substances the iron is present as a part of the porphyrin molecule. The remainder of the body iron is present almost entirely in protein-bound form. These bound forms of iron include the transport iron, transferrin, and the storage iron, ferritin and hemosiderin.

The average adult's diet contains approximately 12-15 mg. of iron per day, of which only about one-tenth is taken into the body iron pool. This iron uptake is balanced by a loss of approximately 1 mg. per day, thus effecting a slightly positive iron balance. A positive balance, however, may not be maintained in the menstruating female, who, because of blood loss, may require an additional 0.5-1.0 mg. of iron per day. Pregnancy is another cause of iron imbalance, for the mother must furnish iron to the fetus and may also lose blood during delivery. These factors account for the frequent finding of hypochromic anemia in women of the menstruating and child-bearing age group, despite a diet of normal iron content. Iron deficiency anemia is also common in infancy and childhood. In these age groups, iron needs are barely met by the best of diets and an inadequate uptake or a defect in iron utilization may result in a marked iron deficiency. In the adult male and the postmenopausal female, iron deficiency is usually associated with chronic blood loss which is often occult. Repeated blood donations may also produce severe iron loss and a consequent anemia.

From these considerations it is readily apparent why hypochromic anemia occurs with such frequency that it is one of the most common conditions presented to the physician for management. Fortunately, the physician has in his therapeutic armamentarium an efficient agent to correct this disorder. Iron is practically a specific, provided that three requisites are met, namely, that it be

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administered in proper dosage, that the anemia be one of true iron deficiency, and that no complicating factors exist. Those factors which may alter a response to iron therapy include continued blood loss, infection, inadequate uptake, abnormal storage processes, defective utilization, and marked nutritional deficiencies. There is little evidence that such agents as the vitamins, trace metals, and liver alter the response in treatment of the great majority of cases of hypochromic anemia. However, many substances other than iron are known to play essential roles in the complex processes of hemopoiesis. These factors may find rational application in those cases which fail to respond to iron therapy alone, but a careful analysis of the cause of hemopoietic failure should be made prior to their use.

The mere fact that there are so many iron preparations available indicates that, despite its specificity in hypochromic anemia, iron therapeusis is still a problem. One of the major difficulties associated with iron therapy is that of the occurrence of gastrointestinal disturbances, such as abdominal cramps, nausea, diarrhea, and constipation. Decreased dosage of iron and the administration of iron with food are often resorted to in an attempt to eliminate gastrointestinal distress. Such practices, however, reduce the amount of iron available for hemopoiesis and limit the effectiveness of treatment, often in those cases wherein the need is greatest.

In addition to the gastrointestinal distress often associated with therapeutic administration of iron, the problem of acute toxicity of iron must now be seriously considered. In recent years an increasing number of near-fatal and fatal poisonings have been reported after the accidental ingestion of iron by children.[1] It is now recognized that the margin between an effective therapeutic dose and a lethal dose of iron is smaller than has been generally assumed. Thus, it is evident that there still exists a pressing need for a form of iron which is therapeutically effective, well tolerated, and, at the same time, safe if accidently ingested in large doses.

It is well recognized that the presence of free or unbound iron in the body fluids and tissues is unphysiologic. This metal is maintained in a bound form, apparently as a chelate complex, not only in the hemoglobin molecule but throughout the processes of its uptake, transport, and storage. The ability of certain organic compounds termed chelating agents to unite with metallic ions is well recognized in the field of chemistry. The chelation of a metal greatly alters its physical, chemical, and physiological properties. It appeared reasonable, therefore, that the oral administration of a chelate iron complex might be advantageous both in terms of increasing therapeutic effectiveness and in terms of decreasing the irritating and toxic effects associated with iron administration.

The purpose of this report is to present our experiences with a chelated iron preparation and to discuss its therapeutic efficacy, gastrointestinal toleration, and relative toxicity. The discussion of the latter subject will include data summarized from animal studies conducted in our laboratories and reported in greater detail elsewhere.[2]

Materials and Methods

The chelated iron complex used in this study was iron choline citrate, a preparation containing 12.5% of elemental iron, synthesized by the interaction of ferric hydroxide and choline dihydrogen citrate under controlled conditions. The present report includes findings in four areas of investigation.

Therapeutic Evaluation.—Eighteen hospitalized patients with iron deficiency anemia of moderate to severe degree were given one sugar-coated tablet of iron choline citrate (40 mg. of iron per tablet) four times daily. The total dose was 160 mg. of elemental iron per day. The iron was administered under supervision between meals. Duration of therapy ranged from 28 to 60 days. The etiology of the anemia was that of chronic blood loss in all but two patients in whom it was believed to be due to long-standing nutritional deficiencies. Hemoglobin, erythrocyte, and reticulocyte determinations were performed every three to five days during the entire period of therapy. Hemoglobin was determined by the method of Sheard and Sanford.[3] A normal hemoglobin level determined by this method is considered to be 15 Gm. per 100 cc. For the purposes of interpretation of clinical responses, values for hemoglobin and erythrocyte determinations are expressed in terms of per cent of normal in one portion of our data (fig. 1).

Twenty-five nonhospitalized individuals with comparatively mild iron deficiency anemia were given a single daily dose of three iron choline citrate tablets (120 mg. of elemental iron). This single dose was administered before breakfast or at midforenoon on an empty stomach. The period of therapy ranged from 15 to 168 days. Hemoglobin level determinations were performed at two-week intervals. A close check was maintained to note evidences of intolerance. This test group was composed of students, staff members, nurses, and hospital personnel whose anemia was due primarily to nutritional inadequacies. No changes in dietary habits were made during the course of therapy.

Gastric Toleration Studies.—Eighty-eight hospitalized patients were given two iron choline citrate tablets (40 mg. of iron per tablet) three times daily. The medication was administered on an empty stomach for a maximal period of 12 days. Each patient was carefully observed for signs of adverse effects and was questioned for symptoms that might be related to the therapy employed.

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Serum Iron Responses (Iron Tolerance Tests).—Five normal individuals (physicians and technicians) were given one fluid ounce of an aqueous ferrous sulfate solution containing 120 mg. of elemental iron. The test dose was administered on an empty stomach to eliminate any effect of food on iron absorption. Serum iron determinations were made by the method of Kingsley and Getchell.[4] Serum was obtained before administration of the test dose of iron and at two-hour intervals thereafter for a period of six hours. These same procedures were repeated in the same individuals after an interval of two weeks, except that a solution of iron choline citrate, offering an equal amount of elemental iron, was substituted for the ferrous sulfate.

Comparative acute toxicities of iron choline citrate, ferrous sulfate, and ferrous gluconate were determined by administering these preparations as aqueous solutions providing equal amounts of elemental iron per kilogram. The iron solutions were administered by stomach tube to unanesthetized rabbits and to dogs under light anesthesia with pentobarbital sodium. All animals were closely observed for signs of toxicity. Survival times were noted, and autopsies were performed on animals which died. Close observation was made of the degree of gross traumatic changes in gastrointestinal tissues. Serum iron levels were determined by a modification of the method of Peterson.[5] Serum was obtained prior to iron administration and at regular intervals thereafter over a six-hour period.

TABLE 1.—*Hemopoietic Responses to Iron Choline Citrate*

Hospitalized Patients; Therapy: 360 Mg. Iron per day as Iron Choline Citrate

Case No.	Type or Cause of Anemia	Length of Treatment (Days)	Hemoglobin Level (Gm./100 cc.) Before Therapy	Hemoglobin Level (Gm./100 cc.) End of Therapy	Hemoglobin Level (Gm./100 cc.) Gain Per Day	Utilization of Iron, %	Erythrocyte Count (Million/Cu.Mm.) Before Therapy	Erythrocyte Count (Million/Cu.Mm.) End of Therapy	Erythrocyte Count (Million/Cu.Mm.) Gain Per Day (Thousands)	Peak Reticulocyte Response, %
1	Menstrual	46	7.8	11.3	0.11	13.8	3.05	4.05	33	5.0
2	Hemorrhoids	42	7.2	12.6	0.16	21.2	3.10	4.40	24	6.0
3	Ulcerative colitis	42	6.7	9.0	0.11	9.0	2.40	3.50	29	6.0
4	Ulcerative colitis	39	9.7	10.8	0.04	4.3	3.20	3.90	27	7.0
5	Intestinal polyposis	42	7.9	9.3	0.05	5.5	2.70	3.30	20	4.5
6	Nutritional	46	11.2	13.5	0.08	9.1	3.60	4.70	37	5.0
7	Menstrual	57	9.4	14.1	0.14	18.5	3.40	4.90	43	9.5
8	Hiatus hernia	55	5.2	11.6	0.19	25.1	2.40	4.00	42	14.5
9	Gastric ulcer	39	8.4	12.6	0.16	16.5	3.50	4.70	30	7.5
10	Diverticulosis	60	5.2	12.3	0.18	27.5	2.60	4.20	40	17.0
11	Postpartum	57	7.8	11.1	0.11	13.6	2.70	4.30	53	5.5
12	Peptic ulcer	61	6.9	12.0	0.17	20.6	2.40	4.30	50	11.0
13	Fibroid uterus	32	5.6	11.1	0.18	23.8	2.20	4.00	60	...
14	Postpartum	30	6.4	12.0	0.19	19.2	2.60	4.10	50	...
15	Menstrual	32	6.1	11.7	0.17	22.0	2.50	4.20	52	...
16	Postpartum	34	7.6	13.1	0.16	21.6	2.20	4.30	32	...
17	Nutritional	28	8.0	12.2	0.15	15.5	3.00	4.20	43	...
18	Postpartum	30	5.6	10.2	0.15	15.8	2.41	4.00	53	...
Av., all cases		41.6	6.8	11.4	0.14	16.7	2.80	4.20	38	8.9
Av. 9 cases, initial (Hb. less than 50%)					0.16	20.4			44	
Av. 9 cases, initial (Hb. greater than 50%)					0.11	13.1			32	

Nonhospitalized Patients—Mild Nutritional Anemia; Therapy: 120 Mg. Iron per day as Iron Choline Citrate

	Length of Treatment (Days)	Av. Hemoglobin Level (Gm./100 cc.) Before Therapy	Av. Hemoglobin Level (Gm./100 cc.) After Therapy	Av. Hemoglobin Level (Gm./100 cc.) Gain Per Day	Av. Utilization of Iron, %
Nurses, students and hospital staff (total, 25 Cases)	Av. 84.3 (Range 15-168)	10.6	12.5	0.02	3.1

Serum iron responses to 120 mg. of elemental iron as ferrous sulfate and iron choline citrate were determined in a similar manner in two separate groups of four patients with moderate to severe degrees of iron deficiency anemia.

Acute Toxicity Studies.—The acute toxicity studies in experimental animals, reviewed in part in this report, will be more fully recorded elsewhere.[2] These animal investigations included comparisons of the acute toxicity of iron choline citrate, ferrous sulfate, and ferrous gluconate. Another portion of the animal investigations was devoted to the study of relationships between serum iron levels and toxicity subsequent to the oral administration of each of these preparations.

Results—Therapeutic Response

The administration of 120 mg. of elemental iron per day as iron choline citrate proved to be therapeutically effective in all of the hospitalized patients in this study. Details of the hemopoietic responses in this group are given in table 1 (hospitalized patients). Since hemopoietic responses to oral iron medication depend on duration of therapy and on the initial degree of anemia, both these factors have been considered in derivation of data in this table. All but one of the hospitalized patients underwent treatment for a minimum of one month. Therefore, calculations of (1) hemoglobin gain per day, (2) erythrocyte gain per day, and (3) percentage of iron utilization were based on responses

during the first 30 days of therapy. The necessity of expressing calculations of hemopoiesis in terms of a stated number of days of therapy is readily apparent from an examination of figure 1, which illustrates the responses of one typical patient (case 2), who is also considered in table 1 (hospitalized patients). It can be noted that hemoglobin and erythrocyte values rose more rapidly during the first 30 days of therapy than during the latter part of the treatment period, during which normal levels were being approached.

A detailed examination of table 1 (hospitalized patients) shows that in this group of patients whose anemia was primarily due to chronic blood loss the average hemoglobin level was 6.8 Gm. per 100 cc. before therapy and 11.4 Gm. per 100 cc. at the end of therapy. The hemoglobin gain

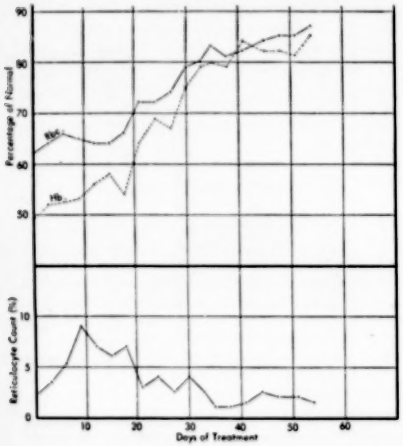

Fig. 1 (case 2, table 1).—Responses in erythrocyte count, reticulocyte count, and hemoglobin level to therapy with 160 mg. of iron choline citrate in a 61-year-old patient with hypochromic anemia due to bleeding hemorrhoids.

per day (30-day period) for the entire group was 0.14 Gm. per 100 cc. However, the effect of the initial degree of anemia on such calculations is well demonstrated by dividing these patients into two groups. In the more severely anemic patients (initial Hb. less than 50% of normal), the gain per day for 30 days was 0.16 Gm. per 100 cc.; in contrast, the response in the group with a lesser degree of anemia (initial Hb. greater than 50% of normal), was only 0.11 Gm. per 100 cc. per day for the same 30-day period. It is evident from these considerations that quantitative evaluations of hemopoietic responses in terms of gain per day are of little significance unless all circumstances which might effect them are carefully considered.

The effects of initial degree of anemia and duration of treatment on hemopoietic responses are further emphasized by a consideration of the data in table 1 (nonhospitalized patients). In this group of ambulatory patients, the initial degree of anemia was relatively low and the treatment period averaged 84 days. The average hemoglobin gain per day under these circumstances was only 0.02 Gm. per 100 cc. Despite this apparent low level, however, clinical responses, both symptomatically and from a laboratory viewpoint, were entirely satisfactory and were comparable to those previously attained from other iron preparations utilized under similar circumstances.

Table 1 (hospitalized patients) reveals that the erythrocyte response in all the hospitalized patients averaged an increase of 38,000 per cubic millimeter per day (30-day period). The more anemic patients in this group, however, averaged a gain of 44,000 per cubic millimeter per day, while those with an initial anemia of a lesser degree averaged a gain of only 32,000 per cubic millimeter per day. Here, again, the degree of initial anemia obviously affected an expression of erythrocyte response in terms of increase in cells per day.

The percentage utilization of iron, as recorded in table 1, was calculated by multiplying the total gain in hemoglobin (grams per 100 cc.) during the first 30 days by a factor of 50. This product denotes the total increase in grams of hemoglobin, assuming an average blood volume of 5,000 cc. for the adult human. The value for total gain in hemoglobin was multiplied by 0.0033, that fraction of the hemoglobin molecule composed of iron. This final product, representing the total iron incorporated into hemoglobin, was then divided by the total iron given during the 30-day period. The quotient was then expressed as percentage of iron utilized in hemoglobin formation. This figure for percentage utilization of iron does not, therefore, include any iron which entered into formation of nonhemoglobin body constituents or was added to body stores. Although such values for percentage utilization of iron are admittedly subject to error due to assumption of 5,000 cc. as the average adult blood volume, they serve to approximate the degree to which the iron of the chelate complex is utilized for hemoglobin regeneration.

Table 1 (hospitalized patients) shows that the average percentage utilization of iron for hemoglobin synthesis in the hospitalized group (30-day period) was 16.7%. In the more anemic patients in this group the percentage of utilization was 20.4%. In those with the lesser degree of initial anemia the value was 13.1%. These values indicate that the iron of iron choline citrate was utilized in a highly satisfactory manner.

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The data in table 1 (nonhospitalized patients) again emphasizes the necessity of considering such factors as the degree of initial anemia and the period of therapy in any quantitative comparisons of iron utilization. These ambulatory patients all had a mild degree of initial anemia. Moreover, the average period of therapy in this group (84 days) was much greater than the 30-day period chosen to calculate iron utilization in the severely anemic patients in table 1 (hospitalized patients). A value of 3.1% iron utilization calculated under such conditions may, at first glance, be misleading. Clinical responses in these mildly anemic patients, treated with minimal dosages of iron choline citrate, were entirely adequate. It is evident from these data that the iron of the chelate complex is readily available for physiological uptake even in those patients in whom the capacity to absorb iron is not accentuated by a marked iron deficiency.

Reticulocyte counts were performed at regular intervals in 12 of the hospitalized patients who received 160 mg. of iron per day as iron choline citrate. All patients showed an adequate reticulocyte response, ranging from 5 to 17%, with an average peak response of 8.2%. There was a rough relationship between the degree of initial anemia and the peak values attained. The maximal reticulocyte response was noted at about the end of the first week of therapy.

Results—Gastrointestinal Toleration

In all of the 131 cases studied (table 2), the iron choline citrate tablets were administered between meals on an empty stomach in order to minimize any effect of food in decreasing untoward gastrointestinal symptoms. Of the 88 hospitalized patients given two iron choline citrate tablets three times daily (total, 240 mg. of iron), only 6 patients evidenced any signs of gastrointestinal distress. Complaints were limited to nausea, diarrhea, or constipation, all of mild degree. All signs and symptoms disappeared with continued therapy. In no case was modification of iron choline citrate dosage necessary. In the group of 18 hospitalized patients given 160 mg. of iron as iron choline citrate daily in four divided doses, there were no instances of gastrointestinal upsets nor were any induced in the group of 25 mildly anemic ambulatory patients who received 120 mg. of iron as iron choline citrate as a single daily dose for periods of continuous therapy up to 168 days.

In this series of 131 patients given iron choline citrate in dosages ranging from 120 to 240 mg. of iron daily for a total of 3,303 treatment days, there were only six patients, (4.6%) who complained of gastrointestinal disturbances of any nature. All these six patients were in that group receiving the maximal dose of iron. Moreover, eight individuals in this study, exclusive of these six, stated that they had been unable to tolerate any other iron preparation, but these eight tolerated iron choline citrate without any discomfort.

Results—Iron Tolerance Studies (Serum Iron)

Figure 2 (*A* and *B*) records a comparison of serum iron levels following test doses of equal amounts of elemental iron as ferrous sulfate and as iron choline citrate, allowing two-week intervals between administration of the two different forms of iron to the same group of normal individuals.

TABLE 2.—*Gastrointestinal Intolerance to Iron Choline Citrate*

Cases		Treatment, Amount*	Treatment-Days	Patients with Intolerance		Remarks
No.	Type			No.	%	
88	Hospitalized	80 mg. Fe (t.i.d.)	412	6	6.8	Complaints limited to mild diarrhea, nausea, or constipation, disappearing on continued therapy. Discontinuance of medication not required in any case. Eight patients were unable to take other forms of iron but tolerated iron choline citrate well.
18	Hospitalized	40 mg. Fe (q.i.d.)	783	...	...	
25	Non-hospitalized	120 mg. Fe (single dose)	2,108	...	...	
Totals 131			3,303	6	4.6	

* Iron choline citrate administered at early morning or midafternoon period on empty stomach.

These data indicate that the utilization of iron from iron choline citrate is effected in essentially the same manner as is that from ferrous sulfate.

In figure 2 (*C* and *D*) are depicted typical serum iron responses in two different groups of anemic patients given equal amounts of elemental iron in the form of ferrous sulfate and iron choline citrate. It is evident that initial serum iron levels in these anemic patients were significantly lower than those in the normal individuals. However, after the administration of 120 mg. of iron as iron choline citrate, serum iron in the anemic patients rose rapidly. The average increment above control values was 134 mcg. per 100 cc., a value twice that attained in normal individuals receiving the same amount of iron in the form of this same preparation.

These data indicate that the iron of the chelate complex is readily available for uptake by physiological processes and that it will rapidly restore subnormal plasma iron levels to normal. It is significant that maximal serum iron levels after administration of the iron choline citrate did not in any case exceed accepted values for total iron binding capacity and that these levels were somewhat lower than those attained after ferrous sulfate administration. Hemmeler [6] administered an

equal amount of iron as ferrous sulfate (120 mg.) to a group of anemic patients and reported maximal serum iron responses higher than those attained in our series. In some cases in Hemmeler's series, maximal serum iron levels rose well above 400 mcg. per 100 cc. These values indicate that maximal iron binding capacities may have been approached or even exceeded in some instances. Such differences between maximal serum iron responses to therapeutic doses of iron as ferrous sulfate and iron choline citrate may possibly be significant when considered in the light of the acute toxicity studies reported below.

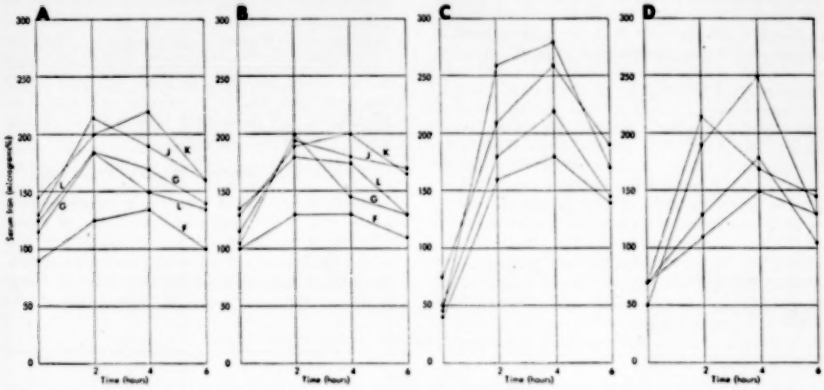

Fig. 2.—Serum iron responses in humans after administration of equal amounts of elemental iron as ferrous sulfate and as iron choline citrate. *A*, single dose of 120 mg. as ferrous sulfate administered to normal individuals. *B*, single dose of 120 mg. as iron choline citrate administered to same persons after two-week interval. *C*, single dose of 120 mg. as ferrous sulfate administered to patients with iron-deficiency anemia. *D*, Single dose of 120 mg. as iron choline citrate administered to a separate group of anemic patients.

over 90% of those animals given 250 mg. of iron per kilogram of body weight as iron choline citrate survived without evidence of toxicity, either immediate or delayed. Moreover, half of the animals given 500 mg. of iron per kilogram of body weight as iron choline citrate survived, and one animal survived even after administration of 1,000 mg. of iron per kilogram of body weight in the form of this chelate complex.

In those animals which failed to survive after administration of ferrous sulfate and ferrous gluconate, signs of acute toxicity were apparent shortly after administration of the test done. There

TABLE 3.—*Comparative Acute Iron Toxicity in Experimental Animals*

Dosage (Mg. Iron/Kg. Body Wt.)	Iron Preparations Utilized								
	Ferrous Sulfate			Ferrous Gluconate			Iron Choline Citrate		
	No. of Animals*	Survived		No. of Animals*	Survived		No. of Animals*	Survived	
		No.	%		No.	%		No.	%
100	5(R)	5	100	5(D)	5	100	...	...	...
150	11(5R, 6D)	11	100	2	1	50	...	...	...
200	15(5R, 10D)	5	33	5(D)	0	0	10(5R, 5D)	10	100
250	30(10R, 20D)	0	0	6(D)	0	0	40(10R, 30D)	37	92.5
500	...	...	...	...	...	...	10(5R, 5D)	5	50
1000	..	...	...	...	...	...	5(R)	1	20

*Rabbits (R) Dogs (D).

Results—Toxicity Studies

Table 3 shows that all animals given ferrous gluconate at a level supplying 200 mg. of iron per kilogram of body weight died and, similarly, that all animals receiving 250 mg. of iron per kilogram of body weight as ferrous sulfate died. In contrast, animals declined rapidly, and death occurred within a few hours. Tables 3 and 4 show that survival percentages and survival times of animals treated with ferrous gluconate were less than in those receiving comparable doses of iron as ferrous sulfate. These data indicate that, under the conditions of this study, the acute toxicity of ferrous

gluconate was even greater than that of ferrous sulfate. From table 3 it is evident that the acute toxicity of iron choline citrate is much less than that of ferrous sulfate and ferrous gluconate. In the few animals which failed to survive the administration of 250 mg. as iron choline citrate, signs of toxicity did not appear for a period of several hours after the test dose and survival times greatly exceeded those of animals dying from equal, or even lesser amounts, of iron as ferrous sulfate and ferrous gluconate.

Serum iron levels (table 4), determined at regular intervals after oral administration of ferrous sulfate, ferrous gluconate, and iron choline citrate, reveal that the greater incidence of toxic and fatal reactions in dogs after oral administration of iron as ferrous sulfate and ferrous gluconate was associated with sudden and massive increases in serum iron values. In those animals dying from ferrous sulfate and ferrous gluconate poisoning, serum iron rose to levels which were 50-100 times control values. It is evident from these data that the total iron-binding capacity of the plasma was greatly exceeded within a short period after administration of the test doses of iron. It is further evident from a consideration of table 4 that the lesser incidence of acute toxicity and death after iron choline citrate administration was associated with maintenance of serum iron at relatively low levels, the peak serum iron values in surviving animals reaching levels which were only about five times those of control values. Even in the few animals not surviving after iron choline citrate administration, serum iron levels rose only to values approximately 16 times those of control levels. Maximal serum iron responses and survival periods in these animals were in sharp contrast to those observed in animals dying from the same test doses of iron in the form of ferrous sulfate and ferrous gluconate. These data clearly indicate a positive relationship between the magnitude of serum iron elevation and mortality after iron administration. Postmortem examinations in nonsurviving animals failed to reveal gastrointestinal lesions of sufficient degree to account for the acutely fatal effects.

TABLE 4.—*Serum Iron Levels and Survival Times After Administration of Iron in Dogs*

Iron Preparation Utilized	No. of Dogs	Dosage (Mg. Iron/Kg. Body Wt.)	Serum Iron Levels (Mcg./100 Cc.) Control	1 hr.	2 hr.	3 hr.	4 hr.	6 hr.	Survival Time, Hr.
Ferrous sulfate	1	150	108	1,400	1,661	1,012	940	912	Survived
	1	200	171	2,100	2,280	2,656	1,782	1,422	Survived
	10	250	158* (98-172)	4,688* (3,025-6,720)	6,787* (4,130-9,940)	6,460* (3,940-9,640)	5,434* (3,160-9,100)	3,698* (2,140-7,820)	All died, Av. 8.4
Ferrous gluconate	1	100	187	520	780	800	740	612	Survived
	1	150	137	9,740	16,000	...	15,850	14,770	Died, 6.5
	1	150	157	320	400	440	440	610	Survived
	1	200	126	2,100	3,240	4,720	7,640	8,200	Died, 7
	1	200	66	3,900	8,400	...	12,800	13,600	Died, 7
	7	250	140 (78-200)	5,130* (1,720-14,000)	8,411* (2,342-16,200)	12,200* (7,824-16,800)	16,340* (9,640-18,500)	13,140* (11,160-16,000)	All died, Av. 5
Iron choline citrate	10	250	116* (72-172)	230* (204-630)	354* (320-1,380)	773* (460-1,460)	770* (420-1,422)	609* (298-1,200)	All survived
	1	250	172	220	250	1,300	2,125	3,000	Died, 48
	1	250	103	300	640	1,265	1,725	2,570	Died, 72
	2	300	147* (116-174)	256* (270-322)	644* (508-620)	791* (740-842)	815* (766-864)	682* (312-854)	Survived
	1	500	92	640	1,000	1,660	2,720	3,100	Died, 65

* Average values and range.

Comment

Therapy of iron deficiency anemia illustrates adequately the axiom, "Where there is a host of remedies, no one of them is completely satisfactory."

Most iron preparations which are hemopoietically effective give rise to troublesome side-effects which limit their clinical usefulness. The literature reflects a high incidence of intolerance to ferrous sulfate, such values varying from 13% as reported by O'Sullivan and his co-workers [7] to one of 50% in a group of pregnant women reported on by Gatenby and Lillie.[8] Adverse symptomatology, therefore, frequently necessitates limitation of therapy or the utilization of parenteral iron with all its inherent hazards.

Data presented in this report indicate that iron choline citrate, a chelated form of iron, possesses outstanding qualities in terms of freedom from undesirable gastrointestinal effects. Those patients manifesting minor degrees of intolerance were all in the hospitalized group, and they received the maximal dose of iron. This low incidence of adverse symptoms is all the more significant in view of the fact that the iron choline citrate was administered between meals on an empty stomach. Moreover, all untoward symptoms promptly cleared despite continued therapy with the chelated iron at the same dosage level.

The treatment of anemia in the patient with peptic ulcer is often a problem. Intolerance to iron often exacerbates ulcer symptoms and retards healing of the lesion. However, four of the pa-

tients treated in this study had well-defined peptic ulcers. In none of these was gastrointestinal distress associated with iron choline citrate therapy. Iron utilization and hemopoietic responses were good in spite of the fact that the iron was administered concomitantly with antacids, milk, and a high-protein diet, all of which tend to precipitate iron from solution and to limit its usefulness in ulcer patients.

Chelation is a well-recognized chemical process wherein metallic ions are sequestered and bound into claw-like rings within the chelating molecule. Metals thus bound lose their ordinary properties when they enter into the chelate union. The amount of a given metal which can be taken into solution may be greatly altered, and the metal may resist forces which would precipitate it from solution were it present in an ionic form. One gram of iron choline citrate will dissolve in 0.2 ml. of water, a solubility of 500 Gm. per 100 ml. Moreover, the iron of this chelate will remain in solution at pH values up to 10.2 and in the presence of such natural iron precipitants as protein, phosphates, and carbonates. Dialysis studies reveal that the diffusibility of iron from iron choline citrate is very low in comparison with the iron of ferrous sulfate and ferrous gluconate. These properties may account in part for the effectiveness of the chelate as a therapeutic agent, for its iron may be maintained in solution over a greater area of the gastrointestinal tract, thus permitting an optimal physiological uptake by union with iron acceptors. At the same time, direct diffusion into the circulation may be minimized, even if high concentrations of iron are ingested.

Applications of chelation have been extensive in analytical chemistry and in industry. More recently, uses of chelation have been made in such problems of experimental and clinical medicine as the treatment of heavy metal poisoning, the reversal of hemochromatosis, the dissolution of renal concretions, and the mobilization of atheromatous deposits.

Hemoglobin has long been recognized to be a chelate complex of iron, but only recently has chelation been associated with other phases of iron metabolism. According to Pirzio-Biroli,[9] the uptake of iron by apoferritin, its transport in the plasma by transferrin, and its storage as ferritin utilize processes of chelation to maintain iron in a physiological bound form. It is not surprising, therefore, that the presentation of iron to the system as a chelate complex minimizes those adverse aspects of therapy associated with the use of readily ionizable preparations. The high order of toleration of iron choline citrate, which permits its administration between meals, is a factor of importance in view of the loss of iron known to occur when ordinary iron preparations are given with food.

It is clearly evident that iron can no longer be considered an innocuous substance. Clark[10] states that 1 Gm. of ferrous sulfate is a potentially lethal dose for a child. With the widespread use of iron the problem of accidental poisoning in children is becoming increasingly serious. As in all poisonings, prevention, rather than treatment, is the issue of primary importance. The physician must assume the very real responsibility of warning all patients that iron preparations may be dangerous if allowed to get into the hands of children.

There is no doubt that necrosis of mucosal tissues occurs in cases of iron poisoning in children, for the preparation ingested is usually in tablet form. In this study the iron was administered as an aqueous solution, and, in our opinion, the degree of gross trauma to gastrointestinal tissues was insufficient to account for death of the experimental animals. The data herein indicate a positive relationship between elevation of serum iron level and the fatal effects of the orally administered iron solutions. Markedly elevated serum iron levels developed rapidly despite the presence of a physically intact mucosa.

Although the possibility exists that the relatively low serum iron levels produced by massive doses of the chelated iron may be due to increased rates of disappearance of iron, we are of the opinion that they reflect a lower rate of entrance of this metal into the circulation. Our views are, therefore, in agreement with those of Reissmann and his co-workers[11] that acute iron poisoning must be considered to be a true absorptive intoxication. It is evident from these considerations that greater emphasis must be placed on the systemic aspects of acute iron poisoning, both in terms of prevention of rapid movement of iron into the circulation and in terms of combating the effects of the absorbed iron.

Others have attempted to utilize comparative magnitudes of serum iron elevations to evaluate the relative merits of iron preparations as hematinic agents.[12] In our opinion such comparisons are not completely valid. In this study serum iron responses to single therapeutic doses of iron choline citrate are reported only to establish the physiological availability of the chelated iron. The marked similarity of serum iron responses to ferrous sulfate and iron choline citrate serves to indicate that, at therapeutic levels, the iron of these two preparations is utilized in a comparable manner. Moreover, they show that in anemic patients the availability of iron from the chelate is adequate to meet the increased demands of the body for iron and to restore subnormal serum iron levels to normal. Beyond this point there appears to be no virtue in attempting to increase the rate of iron uptake. In fact, it would appear that any agent capable of producing marked elevations of serum

iron at therapeutic levels of intake might be potentially toxic, or even lethal, if accidentally ingested in overdosage.

The chelation of iron permits the formation of a clinically effective and well-tolerated iron preparation for oral administration. Since iron choline citrate also possesses a high factor of safety in terms of prevention of accidental poisoning in children, the physician should welcome the addition of this agent to his therapeutic armamentarium.

Summary

There is an increasing incidence of death in children after accidental ingestion of overdosages of therapeutic iron preparations. In this study, toxic and lethal effects of orally administered iron were related to extreme elevations of serum iron and to a resultant systemic toxicity associated with the presence of unbound iron in body tissues. Passage of iron into the circulation in toxic amounts occurred independently of gross necrosis of mucosal tissue. The chelation of iron minimized its toxicity and provided a high factor of safety against fatal poisoning. Hemopoietic and clinical responses in humans were not impaired by the chelate binding of the iron.

300 Main St. (Dr. Kemp).

The iron choline citrate used in these studies was obtained as Ferrolip from Flint, Eaton & Company, Decatur, Ill.

Sincere appreciation is extended to Dr. W. M. Fowler, Department of Medicine, University Hospital, State University of Iowa School of Medicine, Iowa City, Ia., for data regarding non-hospitalized anemic patients described in table 1 of this report.

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WATER REQUIREMENTS FOR MAN.—No single table of water allowances can be set up which will apply in all situations. . . . Under mild desert conditions, with minimum activity, 2 quarts of drinking water per man are needed each day. As the ambient temperature rises or activity increases, the amount of water required by a man per day becomes greater. When the temperature approaches 100 F and soldiers are engaged in strenuous maneuvers, more than 12 quarts of water per day per man may be needed to keep the troops in effective functioning condition. As men become acclimatized to heat their voluntary intake of water increases. Ordinarily, however, this intake replaces only about one half of the water lost by sweat. Thirst is not an adequate index of water requirement in the individual. That dehydration resulting from sweat losses in the heat is truly physiological, can be demonstrated by the improved performance of physical work after men have been forced to drink sufficient water to completely replace sweat losses. The only known method of repairing the damage done to the human machine by dehydration is to replace lost body water. The signs and symptoms associated with simple dehydration disappear rapidly and dramatically when water is drunk.—C. G. Wilber, Ph.D., Water Requirements of Man, *United States Armed Forces Medical Journal*, August, 1957.

OBSERVATIONS ON SURVIVAL OF PATIENTS TREATED FOR UTERINE CANCER

THIRTY-FOUR YEAR PERIOD (1921-1955)

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Survival is not a synonym for comfort, and the statistics for five-year survivals after treatment for cancer cannot reflect the vicissitudes of the individual patient. A series of 487 cancer patients treated from 1921 through 1947 included a group of 127 with cancer of the cervix, and 77 (60%) of this group are living from 10 to 29 years since the time of treatment. A number of histories are given, particularly that of a woman who died of apoplexy at the age of 86, 32 years after her first treatment with radium for cancer of the cervix. There were long-term survivors irrespective of the techniques of treatment. Similar experiences are recorded for cancer of the corpus uteri, and the histories given include that of a woman living at the age of 87, 32 years after surgery. Granulosa cell tumor of an ovary developed in two patients, 10 years after radium therapy for cervical cancers. Examples of long survival occurred regardless of the grade of malignancy of the tumor or whether treatment had been by radium, surgery, or the two combined.

This is not intended to be a statistical paper. Principally it is a narrative of some of the happenings personally observed in the careers of patients who have survived from 10 to 32 years after treatment for cancer of the uterine cervix and corpus. The span of time involved represents an uninterrupted association with the gynecologic division of Jefferson Medical College Hospital and its uterine cancer follow-up clinic from 1921 until 1955. Before 1940 the work was carried out under the direction of the late Dr. Brooke M. Anspach. From 1940 until 1955, it was under my direction. This paper also represents an attempt to offer conclusions drawn from this experience that might relate to problems of prevention and management of uterine cancer, especially in the light of current research potential.

The data utilized are derived from those patients registered on the gynecologic ward service during the era noted and from my private service. A 10-year survival period has been chosen as an arbitrary base line for this selective survey since the vulnerability of the 5-year criterion, the common yard stick for so-called cured cancer patients, is well known. In 1955 Emge [1] brought to our attention the fact that nearly 1,500 patients with untreated cancer of the corpus, cervix, and ovary, as reported to the California State Tumor Registry between 1942 and 1945, presented five-year survival rates of 40.8, 34.4, and 20.2% respectively. The term survival, however, is not necessarily synonymous with comfort.

Cancer of the Cervix

In 1952 a comprehensive and statistically documented report from the gynecologic ward service appeared in the *American Journal of Obstetrics and Gynecology* [2] as the fifth of a series of "five-year reports" that were instituted in 1931. In substance this exhaustive review presented in adequate detail not only the evolution of irradiation therapy from 1921 to 1946 with respect to progressively improving survival rates, but specific data about 463 patients treated. Of these, 134 had then survived from 5 to 25 years and the follow-up was 98.5%.

This report is referred to because the basic concept of therapy, although modified by three selective periods of changed techniques throughout the time mentioned, has remained basically radiologic. These alterations finally culminated in a "planned type" of therapy that has been followed rather consistently since 1942. After 1949-1950, surgical procedures have played a more conspicuous part, evidenced by postirradiation lymphadenectomy and radical hysterectomy in selected instances. Those interested in these details are referred to the article mentioned above and its extensive bibliography.

The radium applications in both the cervical and corpus cases during the period covered in this presentation have always been the responsibility of the gynecologist, in close cooperation with the radiologist. Likewise the technique of external irradiation has been carried out and supervised by the radiologist in similar cooperative fashion. Arneson [3] discussed this arrangement admirably and objectively in the Carman lecture two years ago.

The comment to follow is derived from a studied appraisal of 127 patients grouped as follows: 1. Seventy-seven (60%) are alive as of this report, having survived from 10 to 29 years after treatment for

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cancer of the cervix. 2. Fifty-one (40%) eventually died from cancer of the cervix or from some other cause after surviving from 10 to 32 years after treatment. A few patients untraced for more than a year or so past are regarded as deceased pending further information. These 127 patients also represented 26% of 487 cancer patients treated from 1921 through 1947. The ages range from relatively few under 30 years to 38 between 70 and 90, the majority ranging from 30 to 69. A wealth of accumulated data offers material for study and appraisal from many angles, but the confines of this paper permit but a sampling of numerous significant and interesting occurrences.

Speaking in general terms, there were twice as many stage 2 lesions as stage 1, with relatively few stage 3. Histologically, low and intermediate grade lesions predominated, with a paucity of anaplastic growths and adenocarcinomas. In other words these frequencies are in line with our previous statistical experience. As might be anticipated, those surviving or those deceased from other causes responded equally well to any one of the three progressive types of therapy employed. Second primary cancers of the gastrointestinal tract were of the order generally noted.

Individual Survival Periods

Of unusual interest were two patients treated between 1925 and 1930 with radium for cancer of the cervix. Ten years later, a granulosa cell tumor of the left ovary was removed from one patient. Apoplexy was the cause of death when she was 86—a total survival period of 32 years. The second patient was given radium for a cervical stump cancer, and nearly 10 years later a granulosa cell tumor was removed, without evidence of residual cancer of the cervix. A year later, she died of apoplexy at the age of 65—a 13-year survival period.

Another patient had an initial simple total hysterectomy with adnexal removal. Soon thereafter there was a recurrence which yielded to interstitial irradiation and x-ray. She survived for 32 years. Another woman was treated with radium for an anaplastic cancer of the cervix when she was 22. She is still living 29 years later. Another woman is still living 20 years after receiving x-ray therapy for a stage 1 lesion. She refused the routine radium treatment secondarily, but she keeps in touch with the follow-up clinic. One woman received x-ray therapy after drainage of a pyometra with negative curettage twice. Two years later she received radium therapy when follow-up biopsy revealed squamous cell cancer. She died of cardiac disease 23 years later at the age of 86.

A patient with stage 2 stump cancer developed a rectosigmoidal stricture after radium therapy but has lived comfortably with colostomy status for 17 years. She is now partially incapacitated by hemiplegia at the age of 66. A 71-year-old patient with a similar stump cancer has survived 29 years. In one patient, severe and recurrent hematuria two years after radium and x-ray therapy for a stage 1 lesion, and repeated external irradiation for supposed recurrence, necessitated over 50 transfusions in over a decade. In the 16th year of this patient's survival, symptoms of cerebral instability appeared, and operation disclosed a metastatic brain lesion identical histologically with the original biopsy. The patient died at 60 years of age. A woman with a stage 3 lesion of marked extent was treated with x-ray and radium. At the time of writing, 13 years after treatment, there is no evidence of active disease.

Thirteen years after treatment of a stage 2 lesion with no evidence of recurrence, a patient neglected a sore in the buccal cavity. Her condition is rapidly deteriorating in spite of extensive irradiation therapy. Eleven years after treatment for a stage 2 lesion, a 63-year-old patient developed bladder trouble suddenly, and death occurred within a brief time from extensive necrosis and gangrene of the bladder with advanced pyelonephrosis and destructive ureteritis as revealed at autopsy. A patient with a stage 2 cervical stump treated with radium survived 14 years before she died of pulmonary tuberculosis and cardiac disease. Another patient with a similar lesion and treatment died 11 years later of lung cancer, which was thought at autopsy to be a second primary lesion.

Three patients with stage 1, 2, and 3 stump lesions treated with radium and x-ray survived 12, 10, and 12 years respectively. All died of recurrence. A 52-year-old patient with procidentia had a stage 1 lesion which responded well to x-ray and radium therapy. Shrinkage and retraction of the uterus occurred and two years later the uterus, adnexa, and a fair amount of parametrium were removed and found free of cancer. The vaginal vault was slow in healing because of necrobiosis. She has survived for 14 years and remains in good health.

Gradation of tumor has shown no specific relation to therapeutic response or survival time. In general, these long-term survivors have experienced varying degrees of discomfort from irradiation therapy, but only one developed a rectovaginal fistula. This is a selective but happier story than that reported in the 1952 statistical report, when the general incidence of irradiation damage—proctitis, sigmoiditis, cystitis, and fistula—increased notably with the use of local and heavier external irradiation techniques used after 1942. Rectovaginal and vesicovaginal fistula in that report were 4.1 and 4.7% respectively.

Stage 1 lesions are being seen more frequently, but stage 2 continue to be nearly twice as frequent. Few patients with stage 3 lesions survived for long periods. No case of carcinoma in situ was observed in this review. The grade of the lesion has been of no prognostic significance. A biopsy specimen has sometimes revealed varying areas of gradation.

The fact that there were long-term survivors irrespective of the various techniques of treatment used would seem to indicate that the degree of radiosensitivity is more of a deciding factor than technical details, but radiosensitivity is not necessarily compatible with radiocurability. Deaths from late recurrence or unarrested disease occurring as long as 12 to 16 years after diagnosis lead to the belief that modified panhysterectomy and adnexal removal should be carried out more frequently after a satisfactory irradiation result has been achieved. Removal of tributary lymph nodes in such instances should not be attempted because of the risk of releasing residual cancer cells imprisoned by postirradiation fibrosis.

Heavier and more intensive irradiation therapy exacts its toll of discomfort, complications, and death in a minority of patients with stage 1 and 2 cancer. Long-time survival is rare among those with stage 3 cancer, and it would seem wise and humane to administer only limited irradiation to such people. "Palliative" irradiation in a patient with stage 4 is indeed a doubtful blessing. The absence of radical surgery among the long-term survivors in this presentation might serve for comparison with a similarly followed group of long-term survivors after radical hysterectomy and lymph node excision.

Cancer of the Corpus

Beginning in 1934, quite a number of formal reports [4] regarding diagnosis and management of corpus cancer were issued by the gynecologic division. This statistically documented evaluation related to ward patients and those on the private service of Dr. Anspach and various departmental colleagues, and those seen by me. Reference to precise data regarding these findings can be found in the bibliographies of the specific references just noted.

Immediate surgery was employed freely in seemingly early cases, but, as with cervical cancer, radium and x-ray were relied upon in advanced cases and in obese women or those in whom we had first recognized the "corpus cancer syndrome" 25 years ago! This was also true of the elderly woman with surgical risk problems. When an increasing number of surgically treated patients were seen relatively soon thereafter with metastatic or recurrent cancer in the vaginal vault and vagina, a precise review stressing tumor gradation and associated factors led to the plan of primary treatment of the corpus with radium six to eight weeks prior to surgery. That is how the method of "planned therapy" for corpus cancer came about. No routine removal of lymph nodes was practiced and no postoperative x-ray was used unless objective findings warranted exposing the intestinal tract to irradiation effects. Accompanying myomas of various types or other contraindicating factors do not always permit radium placement, and then postoperative irradiation becomes optional.

Comments that follow stem from personal association with 55 patients grouped thus: 1. Forty-one (less than 75%) are presently alive, having survived from 10 to 32 years after treatment for cancer of the corpus. 2. Fourteen (more than 25%) are dead from causes other than cancer or are presently lost to follow-up but were still free of recurrence several years ago.

An 87-year-old patient has survived 32 years after surgery for a low grade lesion. Another woman had radium and x-ray therapy four years subsequent to surgery and then more x-ray for an intermediate grade lesion. She survived 19 years before she died of a second primary cancer of the lung at 56 years of age. Two patients with high grade (anaplastic) lesions were treated 20 and 22 years ago with radium and x-ray, and radium alone. Test curettage several years later was negative in each. The first patient is now 57 years old and has remained entirely well. The second patient is now 62 years old and has had repeated bouts of hematuria incidental to late irradiation damage, with complicating myocardial insufficiency.

A patient treated with radium and subsequent surgery 19 years ago, without residual endometrial tumor (low grade), recently underwent a segmental lung resection because of a suggestive x-ray, but the pathological report was chronic pneumonitis. Seventeen years ago, a then 60-year-old woman survived two postoperative pulmonary emboli after radium treatment and subsequent surgery for an intermediate grade lesion; no residual tumor was present. A 77-year-old patient received radium for an intermediate grade lesion and survived 13 years, dying of cardiac disease at the age of 90. An excessively obese patient is still living 15 years after receiving repeated radium applicat'ons within a month for a low grade lesion.

A woman of 80 has survived 16 years after x-ray and radium therapy and surgery for a low grade lesion with attenuated residual tumor. Another woman had an operation 15 years ago for concomitant endometrial and ovarian cancer. The preoperative diagnosis was multiple fibroids and it was impossible to state accurately which of the two cancers was primary. She is now 67 years old and has been a diabetic for several years. A patient with paralysis agitans was given radium therapy for an intermediate grade lesion in 1943. Four years later she was treated elsewhere for enterocolitis, but there was no improvement. She returned for a pelvic recheck. An enlarged corpus and occluded cervix suggested residual tumor mass, pyometra, and chronic intestinal obstruction. Diagnosis was confirmed at surgery with adequate removal of all pelvic organs. She is still living 14 years later at the age of 75. A patient had radium therapy and surgery for an intermediate grade lesion attenuated by the radium and was well for five years when a second primary malignancy of the upper jaw developed. She was responsive to surgery and irradiation at 75 years of age, and has survived these combined lesions 13 years to date.

A 53-year-old woman with excessive hypertension had required colostomy some years previously due to ill-advised surgery for pelvic inflammatory disease. She was given radium therapy for a low grade lesion in 1946 and is still well 11 years later at the age of 64. An 82-year-old woman has survived 13 years after local interstitial radium and external irradiation therapy for recurrence of a lesion in the vaginal vault after primary hysterectomy for an intermediate lesion. A woman developed a postoperative hernia after radium therapy and surgery for an intermediate grade lesion. A small granulosa cell tumor was found in an ovary. She is still living 10 years later at the age of 69. The single adenocarcinoma in the series occurred in a 51-year-old patient. She was treated with radium. At surgery, residual disease in the corpus and a metastatic lesion in one ovary were found. She is still well 13 years later.

It is evident from these cases that group-wise we are dealing with a preponderance of elderly women. Also that there was great opportunity for survival unless the patient had been too long neglected. Although there has been a steady increase in cancer incidence generally, there has also been a progressive increase in longevity rates, which go hand in hand with the rising population curve.

The patients reviewed, with few exceptions, did not deviate from the generally recognized corpus cancer pattern and age bracket. Tumor gradation

was impartial with respect to long-term survival. Low and intermediate grades were equal in number (24); there were 5 high grade lesions. Long-term survivals occurred in this group when treated with radium alone or in combination with external irradiation, and with primary surgery in several instances where cancer had not been diagnosed preoperatively.

Residual tumor after intracavitary radium plus surgery was present in 21 long-term survivors (55%), and absent in 16 (45%). Presence or absence of residual tumor, often attenuated, was equally divided as far as the gradation of the tumor itself was concerned. Thus one-half of the long-term survivors were managed successfully by this "planned" method of treatment, even with residual tumor present as noted. When there is a high index of suspicion because of postmenopausal bleeding and suggestive cytology, intracavitary radium sources have been introduced pending a four-hour permanent section report of the curettage. If the lesion is benign, the radium has been removed immediately; otherwise, cancerocidal dosage is estimated. Surgery should be the ultimate goal in corpus cancer therapy. If definitely contraindicated by a valid reason, intracavitary radium, alone or in combination with external irradiation, can be used to advantage as has been noted in certain of the long-term survivors.

Conclusions

Perseverance in the follow-up of treated cancer patients over a long period is necessary if an exact survival period is to be ascertained in contradistinction to commonly expressed survival rates. The "five-year cure" as a criterion in the results of treatment for uterine cancer is a fallacy.

In the final analysis, the clinician's problem still remains threefold—prophylaxis, detection, management—and the uterus is a favored site for positive and definitive action. Prophylaxis can be practiced in spite of varied and sometimes contradictory concepts of etiology and pathogenesis. The abnormal cervix can be managed with certainty, and atypical endometrial activity is readily subject to investigation.

The uterine cell test of Papanicolaou skillfully utilized can furnish prompt and valuable diagnostic leads from all areas of the uterus—and even from the adnexa at times. Subsequent critical evaluation and/or substantiation of positive or suggestive smears is mandatory by the discipline of cervical biopsies of various types and fractional uterine curettage. No wonder Paul Younge [5] entitled a pertinent article "Cancer of the Uterine Cervix—a Preventable Disease," based on his wide and judicious experience, conservatively applied to the life history of noninvasive malignant epithelium of the cervix, known as that frequently controversial lesion, carcinoma in situ.

The heated poker, used decades ago for the destruction of exuberant cervical growths, gave way to Paquelin's thermocautery, which Emmet used in the 1880's. Then came the heavy-duty cautery, employed by many of us to correct abnormal cervices prophylactically even before routine cervical biopsies and endothermic resections became the mode in addition to curettage. How many noninvasive lesions must have been destroyed thereby! [6]

With increasing knowledge of the "corpus cancer type," it would seem logical to investigate such patients, in the course of routine and periodical examinations that include the uterine cell test, by utilizing the endometrial aspiration technique in addition to vaginal and cervical smears. This prophylactic measure might well apply to the diabetic, obese, and hypertensive patient as well. The presence of fibroids, especially if symptomatic, calls for inquisitive vigilance lest an accompanying endometrial cancer be overlooked.

There is nought on the horizon at present to indicate that any form of chemotherapy can replace present methods for the primary treatment of uterine cancer. Prophylaxis and prompt detection become the joint responsibility of every woman and her physician.

255 S. 17th St. (3).

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HEALTH SERVICES SCHOOL-AGE CHILDREN NEED

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Realistically conceived health services for older children will focus attention on all the health needs typical of this age period, utilizing up-to-date medical practices. Acute illnesses and serious diseases have their lowest incidence during the school years. The physician's challenge is the detection of any unrecognized illness so that the child may benefit from medical treatment before a real handicap develops. Health appraisals are wasted unless there is some follow-through on recommendations for treatment. Continuity of health services, obtained best by periodic visits to the child's own physician, is always necessary.

The most notable accomplishments in pediatrics have been in the care of infants and young children. There are many reasons for this. The health problems in early life, appearing to be more serious, have received the most attention; parents need advice about young children frequently, and thus for them the parent-doctor relationship is more firmly established; and physicians by their training and experience feel confident in dealing with infants and toddlers.

Since World War II the health of the school-age child has been given more and more consideration. A number of factors have combined to stimulate interest in the health of older children, the outstanding ones being advances in the medical care of the preschool-age group, increased emphasis on preventive medicine, the discouraging health conditions revealed by physical examinations of candidates for military service in World War II, mounting interest in improving physical fitness, and the modern educator's broader concept of the school's function in bringing the whole child to his fullest possible development in areas of his health, his personality, and his emotions, as well as in his academic skills.

Health programs in schools are certainly not an innovation, but until recently they have usually consisted of "line-up" inspections or brief examinations done in the schools. The principal emphasis has been on communicable diseases, posture (particularly flat feet), and whether the tonsils appear enlarged. This kind of health service has discovered few of the important health problems of these children, and little has ever been done about following up the medical recommendations.

From the older notion that health services in schools should principally be mass physical examinations there is now a change toward the opinion that the child's own physician, who knows his history and his family and can institute treatment promptly when indications are found, should whenever possible provide the major part of health services in close cooperation with the school authorities. Although it is universally recognized that a child's parents have the primary responsibility for his health, certain health services, such as provision for first aid and emergency measures, firsthand observation of children's behavior, health education, and assistance in encouraging children to obtain recommended medical attention, will always be necessary in the school. As the school-age population increases and knowledge of needed health services for this group grows, it is inevitable that practicing physicians will be called on more and more often to perform periodic health appraisals, to assist in solving scholastic problems, and to advise about behavior disorders. There is no question about the advantages of a personal interview and physical examination in the office of a physician who is a good doctor and a good listener, compared with the results of screening programs based on laboratory tests and hurried examinations.

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Essential Health Services

What are the essential health services for school-age children? Realistically conceived health services for older children will focus attention on all the health needs typical of this age period, utilizing up-to-date medical practices. There is no problem in taking care of the specific complaints in this age group—the acute illnesses and the more or less chronic but familiar disorders which are not different from those of younger children or adults. It is on this basis that physicians have become accustomed to caring for the health of older children. Most would have to agree with Crothers' chiding statement: "Pediatricians will have to admit that they accept the general thesis that all children who are not ill are identical with all equally healthy children of the same age and sex."[1]

Acute illnesses and serious diseases have their lowest incidence during the school years. By this criterion there is little need for health services at this period of life. However, experience has shown that obvious need is not a sound basis for planning health services for this age group. The real health problems of the school-age child today do not threaten his life or send him to the hospital and seldom cause absence from school. Health im-

pairments which can interfere with growth development and education may not produce symptoms sufficient to cause the child or his parents to think of seeking medical attention. Thus, periodic examinations at least every three or four years are advisable in addition to medical attention when specific problems arise.

Unquestionably, it is more difficult to examine an individual for a routine health appraisal than for a specific complaint. Here is the opportunity for physicians to develop the meaningful health services which schools have tried ineffectually to provide in the past.

There are many opportunities for preventive medicine in caring for school-age children. The scope of preventive medical services is increased by thinking of these services as primary, or those which prevent illness, and secondary, or those which limit the further progression of disease already present.

The most significant primary preventive measure is immunization against contagious diseases, and this is essential, regardless of age, during childhood. Normally, or perhaps ideally, the initial or basic series of conventional immunizations would have been administered years before entrance to school, and stimulating or booster doses only would be required during school years. Children who have not already been immunized should be protected at once against smallpox, diphtheria, pertussis, tetanus, and poliomyelitis. If the child has had the basic series during his preschool period, a stimulating immunization against smallpox, diphtheria, tetanus, and pertussis should be given on entrance to school and, except for pertussis, every three years thereafter. As yet, there has been no recommendation for additional boosters of poliomyelitis vaccine after the third dose, which is usually given seven months after the two primary inoculations.

There are other preventive measures of cardinal importance to children of school age. Dental caries affects about 90% of the school-age population. Tooth decay is so universal that ordinarily it is more reasonable for the physician to refer children to their dentist for semiannual examinations than to decide himself whether treatment is necessary. Caries that can be seen could have been detected earlier by dental x-rays and treated. However, in that important part of medical services, health counseling, topical applications of sodium fluoride should be advised in any community that does not obtain a sufficient amount through its water supply.

Even during school years attention to nutrition is important. A proper diet and supplementary vitamins are as essential to growth and development throughout the school years as in infancy. The nutritional problem of obesity is often more frequent than undernutrition, and treatment requires more medical acumen and counseling than in the latter condition.

Rheumatic fever is considered to be uncommon, but still about 1% of school-age children have clinical evidence of rheumatic heart disease. This is a disease that can be prevented by adequate treatment of streptococcic respiratory disease.

The Role of the Physician

Broad interpretation of the scope of preventive medicine implies the importance of early detection and treatment of illnesses which would result in permanent impairment if permitted to progress. Effective preventive measures of this sort require prompt recognition of health disorders so that corrective measures may be taken while disability is still minimal. The physician's challenge is the detection of any unrecognized illness so that the child may benefit from medical treatment before a real handicap develops. There are millions of children in this country with defective vision, impaired hearing, imperfect speech, and nutritional disease which could be corrected before health or school work suffers. Many times symptoms are present but may not be mentioned because children and their parents are not aware of their significance. Furthermore, there are additional thousands of children who have obvious handicaps but for whom no adequate treatment has ever been suggested. Thus, children with cerebral palsy, epilepsy, birth injuries, orthopedic disorders, skin diseases, and congenital heart disease can be helped to attain optimum health by medical advice.

Physical disorders are not the only ones which are responsive to treatment in the early stages. The physician who is alert to the varied problems of school-age children can usually detect or elicit symptoms of emotional or scholastic difficulties before they become sufficiently advanced to cause lasting effects. The older child's physician should also be mindful of those seemingly trivial disorders which often bother youthful patients excessively and, by adult standards, unjustifiably. Thus a physician's recognition and sympathetic discussion of acne, unusually late or early maturation, obesity, marked deviation in height, or even malocclusion of the teeth will often lead to treatment of a condition that otherwise might never be mentioned, and certainly the child's understanding and acceptance of the condition will be improved by his doctor's interest. An adolescent typically wants to be just like other boys or girls of the same age, and variations which are not really significant in a medical sense are very important to them, often becoming a source of anxiety which can be dispelled by explanation or by treatment if indicated.

Physical fitness of the youth of the United States is a subject of considerable interest and discussion at the present time. As usually interpreted by nonmedical persons, physical fitness means physical perfection, maximum strength and suppleness, and vast endurance. In what seems a more realistic understanding of physical fitness, there is implied

an individual's optimum ability to perform the tasks which are necessary for him. In other words, fitness is the achievement of one's own potentiality. Thus a child with an obvious or severe physical handicap can still achieve physical fitness if maximum efficiency is developed for tasks reasonably within the child's capabilities. It is not unusual for physicians to be called on to certify children for athletic competition. Appraisal of the capabilities and fitness of every child for his scholastic tasks, for competitive play with other children, and for carrying out the everyday activities of all children is equally important. Every child should be thoughtfully considered with regard to his fitness for peak performance within his limitations.

Health appraisals are wasted unless there is some follow-through on recommendations for treatment. There is no benefit in knowing which children may be expected to grow up with physical or psychological handicaps unless this knowledge is utilized at once to improve the situation. It is generally believed that one or both parents should be present when children under the age of 14 years are examined. It is natural for adolescent children to prefer being on their own, and they are usually more cooperative when granted this independence in getting medical attention. They want independence from their parents as well as the status with their peers that this self-sufficiency can bring. In either case it is the responsibility of the physician to explain carefully any health problem which has been discovered, to help in planning ways to secure the recommended medical care, and to check at a later date to see whether some action has been taken. In the case of younger children this will be accomplished directly with the parent. With adolescent children the initial explanations and recommendations should be made to the child with the understanding that the parents will be notified. Parents should be brought into planning immediately if the child wishes and certainly at a later date if no follow-up action is taken.

One of the chief advantages of having the child's own physician assume responsibility for periodic examinations is that the chances of having recommendations carried out are considerably improved when the problem can be seen by the parent and explained by the physician and when plans for treatment can be discussed.[2]

The Role of the School

What can schools do to help in health services? With the interest that today's teachers have in the health and welfare of their pupils, providing effective health services for school-age children can best be a cooperative undertaking involving parents, physicians, and school personnel. With young children, the "team" consists of physician and parents; this is especially so because of the acute or primarily medical nature of health problems in the younger age group. Older children are not family-centered, and there are people in the schools and other organizations in the community who can contribute to health supervision; they too need to understand the health status of the children with whom they associate. Teachers can assist by always being attentive to symptoms suggestive of ill health. In reality, teachers during many hours of the day are "proxy parents" and can give valuable assistance in early detection of illness.

School nurses or specially trained teachers can also perform an important function by carrying out some screening tests for visual and hearing acuity, since these procedures can usually be done more efficiently at school than in a physician's office. However, the selection of tests and the manner in which they are given should be the responsibility of the medical profession in each community.

Good health services for school-age children require teamwork, and this means good communication between physicians, parents, and school personnel.[3] Even though a child comes alone to the physician, he cannot be separated from his family and the community. Parents should be advised concerning the state of the child's health, what needs to be done, and the reasons for treatment. Teachers need to know when the child's physical condition may be expected to affect his school program. This subject always brings up questions about the amount of "privileged information" which can be transmitted by a physician. Teachers and nurses today are much better prepared in their professional education to deal with confidential information, but, when a physician has any question about the propriety of making specific information known, he should proceed on the basis that facts are not as important to school personnel as is the advice that, for medical reasons, a child who has specified physical or emotional limitations should be seen by his physician at prescribed intervals and should have a modified program of activity.

Conclusions

Continuity of health services is always necessary. The child's physician, who will be called on with increasing frequency for medical examinations, advice, and treatment, will always be the connecting link between medical services, the child's family, and the community organizations, of which the school is the most important. This is a role physicians should welcome, for it improves on the older concept of overly developed health services in the schools. However, this responsibility cannot be met without an understanding of the physical and emotional problems of school-age children.

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COMPETITIVE ATHLETICS FOR PRE-TEEN-AGE CHILDREN

A CHALLENGE TO PHYSICIANS

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Opinions differ as to the intensity of competition that should be allowed to develop in athletics for children under the age of 13. A child induced to participate in highly competitive sports that imitate adult patterns is subjected to severe physical and emotional strains, and these sometimes profoundly affect his subsequent physical growth and social development. Especially in interscholastic and intercommunity championship games, with uniforms, parades, prizes, and publicity, and with the possibility of vicarious glorification of parent and school, the psychological responses of all concerned can be abnormal in many ways. In the case here described a boy managed to conceal from parents and coach a week-old subluxation of the first cervical vertebra as well as an older, partially healed fracture of the seventh cervical vertebra. Competition must be recognized as normal and desirable in growing children, but it must be kept within bounds. Eleven recommendations are here made as a means of giving pre-teen-agers most of the advantages and a minimum of disadvantages in athletic programs.

The concept of the "total child" is an accepted philosophy in the practice of pediatrics. The medical adviser today cannot be satisfied merely with the child's being well; he must be concerned with the well-being of the child. The physician is no longer merely a dispenser of health services; he is also an educator in health for his young patients and for their parents. Health education and health service start in the nursery. When the child enters school the physician surrenders none of his responsibility. Instead, he and the parents are joined by the classroom teacher, the school nurse, and other school health personnel in a continuing program of health education and health supervision. Ideally, the physician enlarges his area of influence to become a health adviser to the educators, while at the same time he learns some of their problems of education so that teacher and physician can work as a team in maintaining and improving the health of children.[1] As the child's spheres of interest develop, his community activities claim the attention of the physician with the added responsibility of serving as a medical adviser in community recreational and sports projects. The literature contains many excellent reports and studies to guide the physician in this broad area.[2]

Need for Athletic Play

Nowhere is the need for medical guidance and cooperation greater than in the problems connected with the participation of children in competitive athletics. Everyone agrees that competition is essential in the growth and development of children into well-balanced, responsible adults. But there is a distinct difference of opinion as to the level and intensity of competition in which children should engage at the various stages of their development. The most vehement arguments center on the question of athletic competition for children under 13 years of age. Unfortunately, much of the argument has been on an emotional rather than an intellectual basis. While the lines have not been too clearly drawn, on one side are those who, while believing thoroughly in competition, would place certain limitations on the intensity and scope of competitive athletics for young children; in this group are the majority of educators and physicians who have studied the issue. On the other side are those who maintain that highly organized, highly competitive, "varsity-type" athletics are a desirable activity for children in their early school years; this group consists largely of sports promoters, professional athletes, sports fans, and some coaches. Between the two groups are the parents. Some, with a natural ambition to develop an athletic star in the family, are drawn to the side of highly organized pressure programs of athletics; others, concerned primarily with the safety of their children, move toward the opposite camp.

Children's athletic programs can be classified into four groups: (1) those that are a part of the regular school curriculum; (2) those outside the school curriculum but a part of community recreation programs; (3) those organized under independent, special interests related to specific sports or to specific sponsors; and (4) unorganized, pick-up activities, such as "sandlot" and "scrub" games. While athletic programs in schools are more easily regulated, the essential problems of juvenile athletic competition are common to all types of programs. The problems are most apparent in the third, and most rapidly growing group. For example, one of these, Little League Baseball, has a

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membership of over 750,000 children. About 4,000 Little League baseball games are played every day within the specified season.[3]

Arguments for Competitive Athletics

In considering the arguments for and against highly organized, high-pressure competitive athletics in or out of school, it must be remembered that the problem is here limited to children under 13 years of age. The proponents commonly maintain the following arguments: 1. Competition as a part of life must be taught to children during their formative years, and a highly organized program of intercommunity or interscholastic competitive athletics, patterned after that of older groups, is an essential means of doing this. 2. Physical injuries and emotional disturbances sustained in such a program can be insignificant with intelligent adult supervision of the program. 3. Children engaged in competitive athletics are more physically fit, more poised, more relaxed, more confident, and in general superior both as children and as adults to those whose athletic activities are noncompetitive. 4. Children of all ages will instinctively engage in competitive athletic activity, especially in body contact play, such as boxing, "wrastling," and bare-hand fighting, with no holds barred, and to minimize the dangers of such activities, it is better for adults to organize and direct them. 5. Competitive athletics at this age can act as a feeder program to college and professional sports. 6. Competitive athletic programs promote good public relations for the school and for the community.

Before stating the answers that most parents, educators, and physicians would give to these statements, it would be well to define what is meant by highly organized, highly competitive athletics. This includes sports which are played by teams that have been developed through a series of elimination games and which represent a school or a community in championship schedules of interschool, intercommunity, regional, or national games or tournaments. The reverse of this system consists of many teams in a sport or game, involving many children in a school or community, with athletic activity confined to the school or to the community. Highly competitive athletics has been defined by the school health committee of the American Academy of Pediatrics [4] as competition in which the chief stress is placed on winning, with excessive emotional pressures applied by teachers, parents, and others, and with parental interest going to the point of expressing undue concern over winning.

In reviewing the work reported in the literature, one is impressed by the number of writers who group all sports in the same category. The same criteria for avoiding injury, exhaustion, and abnormal bone and muscle growth cannot be applied equally to body-contact and non-body-contact games, nor can they be transferred without modification from any one sport to another. This, together with a failure to designate clearly the age group under discussion, has led to much unnecessary misunderstanding and argument. Such a lack of definitiveness is difficult to avoid because of the limitations of time and space. One is also impressed by the number of studies in which medical problems are investigated by students without a medical background. Many of these studies could be improved through medical consultation and cooperation. This is not so much a criticism of the researchers as it is a pointed suggestion that more physicians should be interested in making such studies. With these points in mind, let us consider the arguments of the proponents.

"Competition is a Part of Life"

No informed person will deny that competition is an essential part of every child's education and growth. But it is equally true that competitive drives must be allowed to develop normally and not be overstimulated or suppressed, so that as the child matures competition and cooperation are balanced forces in his personality. A child can best be developed in respect to posture, coordination, strength and control, and emotional balance by a process of gradual training during the years of physiological immaturity, not by the forced development of special skills.[5] B. L. Johnson [6] of Fresno State College, in an experiment on exercise with 59 junior high school boys, found that they worked harder when put under competitive conditions but that their output was not significantly greater than the boys who were not so motivated. In fact, the added stimulus sometimes reduced the achievement. The competitive group, moreover, showed a slower recovery from heart and blood vessel strain than did the control group. In addition, nausea developed in 37% of the subjects in the motivated group either during the exercise or during the period of recovery, but only one case of nausea occurred in the group not under conditions of competition. An extensive study of Cleveland junior high school boys by Rowe [7] showed that a group competing in highly competitive interscholastic athletics did not gain as much in height, weight, and lung capacity as did a comparable group of boys in the same school who were participating in a good program of physical education and intramural athletics.

Physicians least of all want to eliminate competition from the lives of boys and girls. Physicians are not afraid of children being hurt physically or emotionally if the end-result is one that is of benefit to the child. It is done deliberately when their systems are subjected to vaccines and toxoids and when they are allowed to extricate themselves from emotional or social stresses in which they

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have become involved and which are not beyond their emotional maturity to cope with. But if they are to suffer such insults, these insults should be of the kind that will strengthen them, not those that will permanently harm them." Johnson's study suggests that the stress of strong competition does not improve skills or promote an increased capacity for performance. At times it seems to have an opposite effect, but more investigation under controlled conditions is necessary to clarify this. Until such studies have been made, one must doubt the claim that the stress of competition promotes optimum growth and development. The preponderance of opinion is in favor of limiting competition in prepubescent youth to intramural sports programs."

"Injuries Can Be Insignificant"

The statement, "Injuries can be insignificant with adequate and intelligent adult supervision," contains a number of fallacies. Preadolescent and adolescent children are in a vulnerable age. During this age there are periods of rapid growth, with temporary maladjustments and weaknesses. For example, bone growth at this age is more rapid than muscle development, so that temporarily the bones and joints lack the normal protection of covering muscles and supporting tendons. During these periods, the child is particularly susceptible to dislocations of joints and to bone injuries, especially to the epiphyses. There are injuries which can cause permanent damage and can interfere with normal growth. Dr. C. L. Lowman [10] polled about 400 orthopedists on this point. About 75% of them agreed with a statement made by the state directors of health, physical education, and recreation to the effect that interscholastic athletic competition was not good for young adolescents and that body-contact sports should be eliminated. Most of the other 25% qualified their answers so as practically to rule out this type of athletics as it is now being practiced. Fait,[11] on the other hand, reported that he had surveyed the opinion of a group of orthopedic surgeons and found that only 14% believed that junior high school students were so susceptible to epiphysial injuries that the physical education and athletic programs for this group should differ drastically from the activities offered in the high school program. However, his question was so phrased that the physicians questioned were required to state whether they thought these sports should be modified for younger children. This is really a nonmedical decision on which it is difficult for the physician to give an authoritative opinion.

Violent and sustained exercise and the bruising and fatiguing activities of strenuous competition are believed by many authorities to throw a damaging overload on the immature heart, lungs, or kidneys. Often the damage is not evident at the time but manifests itself weeks or even years later.[12] Evidence to the contrary that I have found in the literature is not well controlled and is not impressive.

Another type of damage is more subtle. In developing skill in a particular sport, the child develops some sets of muscles more than others. As a general rule, strenuous athletics tends to strengthen flexor muscles at the expense of extensor muscles. This leads to a shift in stress and weight bearing, which in turn affects the development of the bones to which the muscles are attached. These abnormal changes in bones occur according to what is well known to physicians as Wolff's law (a bone changes its internal architecture and external shape according to the way in which the weight is borne or the stress is applied; in other words, all changes in the function of a bone are attended by definite alterations in its internal structure). The end-result can well be poor posture which in turn may result in a skeletally malaligned individual.

Foster [13] reports 14 cases in which fractures occurred among high school athletes but in which the diagnosis was not made until x-rays revealed that such an injury had occurred. Many of these fractures had been concealed by players because of the feeling that they might be accused of being "sissies" by their coaches or fellow players. Most of the fractures occurred in the hands, wrists, forearms, feet, ankles, and lower legs. Consider the hazards of permanent deformity in unreported fractures involving the growing ends of long bones. Hibbert [14] reports after extensive study of high school football injuries that one out of every five participants will sustain an injury. Of those injured, one out of five can expect a fractured bone. It is widely recognized that the younger and "greener" the boy, the greater the probability and extent of the injury.[12c] The following case in point is reported from my practice.

A 12-year-old postpubescent boy bumped heads violently with another player in the tryouts for a junior high school football team. He concealed the fact of a painful neck which lasted for two weeks, and continued playing on the team. Six weeks later he had a similar collision and developed a wry neck, which he concealed for one week, and continued to play football every school day. Because of continued pain, he finally admitted his disability to his parents. I saw him one week after the second injury. On x-ray examination (fig. 1), he had a subluxation of the first cervical vertebra and an older, partially healed fracture of the seventh cervical vertebra. After six weeks in traction, he made an uneventful recovery with no residual neurological findings.

There is a definite possibility of paralysis or death in injuries of the type reported above. However, the dangers of high-pressure athletics are not limited to physical injury alone. Strong emotional reactions are too often engendered by high-pressure competitive games, especially by intercommunity or interscholastic schedules and championships. Such a response occurs not only in children but

also in adults—parents, teachers, coaches, and spectators. These exaggerated reactions can lead to abnormal psychological responses, both in parents and in children, in many ways. The hero worship of the star, the sense of failure in the boy who does

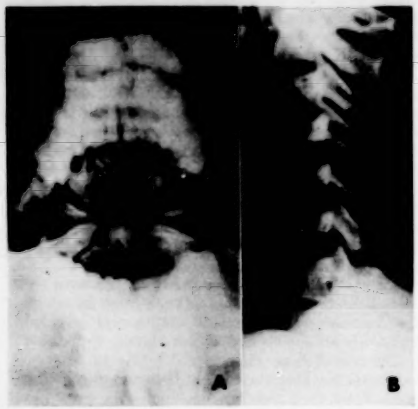

Fig. 1.—*A*, lateral subluxation of C-1 on C-2 with misalignment of odontoid process and facets in 12-year-old boy injured in football game. *B*, partially healed fracture of the body of C-7 and loss of normal cervical lordosis in same boy.

not make the team or who fails to make the crucial point in the game, the obvious disappointment of the parent when the boy fails or the excessive pride and praise when he wins, the apparent difference in social acceptance by playmates and adults between the winners and the losers—all these can have a profound effect on a child's emotional development and social adjustment.

Many of the harmful results engendered by highly competitive sports are due to the fact that they are organized on an adult level. The parades, uniforms, prizes, and general spirit of a Roman holiday presumably glorify the child. But these exhibitions are actually aimed at the parent, who is vicariously glorified, an experience he may have craved but missed in his childhood.

One observer has taken the pulse and respirations of the father of the pitcher of the winning team and of the coach at the end of a World Series game and has found them to be higher than those of the boy who pitched the game.

Much of the injury, both physical and emotional, could be avoided if the opponents were equally matched. Matching by chronologic age or by size is not adequate. During this age span [4] there are wide variations in the rate of physical and emotional maturation (fig. 2). The studies of Pryor and Smith [15] show the difference in size, body build, and physiological maturity that can exist between girls of the same chronologic age. They have also demonstrated the wide differences in achievement between the lateral and the linear type of girl of the same age (fig. 3). Although there is a difference in time as to maturation in boys and girls, the same physiological principles apply to boys at a somewhat later age. Two 12-year-old boys who are well matched as to height and build may be years apart in their physical development and stamina and, perhaps more important, in the maturity of their judgment. The immature boy is no match for his more mature opponent. Not only is he more likely to lose but also he can be badly injured in the process. A striking example of this was demonstrated in a recent study by Hale.[16] He found that the majority of boys who played in the 1955 Little League World Series, boys of 10, 11, and 12 years, were adolescent and, not as their chronologic age would indicate, preadolescent. In other words, in the elimination games the tendency was for the more mature boys to win out over the immature ones. It is gratifying to know that so large a boys' organization recognizes the lack of correlation between chronologic and develop-

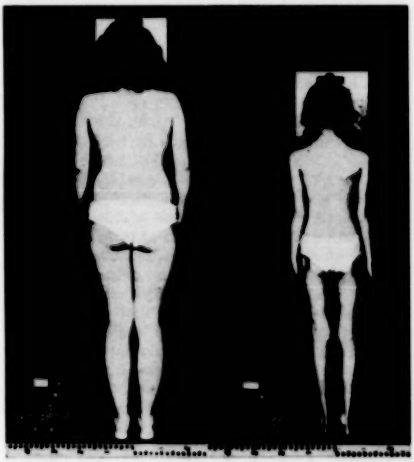

Fig. 2.—Lateral and linear body structures in girls of same age.

mental age. On the other hand, one wonders about the effects on all of the preadolescent boys who went down to defeat as the members of the world series team climbed to stardom.

There are several technical methods of judging the developmental level of the child. Shaffer [17] classifies boys as prepubescent, pubescent, and post-

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pubescent, depending on the presence or absence of pubic hair and the amount of kinking or curling of the hair (the Crampton test). This is a good measure of sexual development, but in my experience there is not enough correlation with the stage of intellectual or emotional maturity to make it useful as a matching test. It has been suggested [9] that bone age, as determined by x-rays of the carpal bones, be used as a guide. This would probably have the same limitations as the Crampton test. Furthermore, until the question of the danger of excessive radiation exposure in the age of nuclear fission has been settled, it would be unwise to institute an additional mass x-ray program.

The boys most likely to be picked for a football team, particularly the linemen, are usually the tallest and heaviest. These "fast growers" may be the least mature physiologically and emotionally and consequently the least able to stand up under bruising contact sports. I know of no test or set of tests as yet developed, applicable for use in the gym or athletic field, which will measure the level of a preteenage child's physical and emotional maturity with sufficient accuracy to match him safely for strenuous athletic competition.

Adequate and intelligent leadership is, of course, of primary importance. The qualifications of leaders have been outlined in the Fourth National Conference on Physicians and Schools.[2a] Besides the technical qualifications which the conference advocated, good leaders understand the needs and desires and the limitations of growing children. They have a sound knowledge of physiology and of child (and parental) psychology, and they can at least partially match the participants. Unfortunately, such leaders are less likely to be available for elementary schools or for community groups, especially in rural areas and in the smaller towns. Men and women with these qualifications are quickly drawn into more lucrative positions in larger cities or in high schools, colleges, or professional athletics, leaving the younger children with a series of promising but relatively inexperienced coaches. The value of having medical counsel available in these situations is apparent.

Health of the Child

"Boys engaged in programs of competitive athletics are healthier than those not in such programs." I know of no sound evidence to substantiate this statement. On the contrary, there is evidence to refute it. Seymour [10] of Springfield College, Mass., studied 114 boys from five Little Leagues in and around Atlanta, Ga., and compared them with the same number of nonparticipating boys. He found no significant difference in problems, needs, or behavioral pattern between the two groups, except that the participants scored significantly higher acceptance by their peers. Fait [11] reported that a study of two comparable groups of junior high school boys (one group participating in interscholastic sports and the other not participating) showed that growth in height was the only statistically significant difference between the two groups, and this difference was in favor of the nonathletic group. This is probably significant when one considers that, generally speaking, the athletic type of boy is larger and/or has more physical ability and that subsequent improvement might be expected to be greater in this group even if they had not participated in athletics.

Instinctive Play

The sudden violent contact of two young boys to "wrastle," slug, or otherwise maul each other is usually an expression of the normal paroxysmal

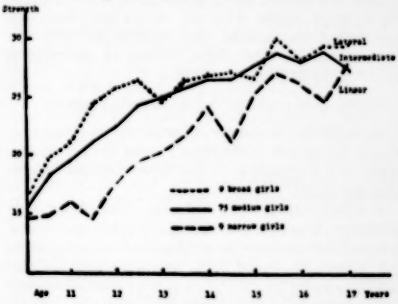

Fig. 3.—Comparison of strength tests in girls with lateral, linear, and intermediate builds. Note variation in strength, especially in the preteen and early teen years.

surge of energy seen in all growing animals. Such contact serves as a release of excess energy and lasts only until it has accomplished its purpose. Unless one of the children is a bully, it usually stops short of any injury. If one of the boys is a bully or if such activity involves a group and develops into an organized sport, such as tackle football or any other form of mass tackling, it ceases to be harmless or desirable. It then becomes the duty of the adults responsible for the children's activities, parents or physical educators, to direct the children to more appropriate, safe, and beneficial outlets for the needed expenditure of their abundant energies. This does not eliminate training in football as an activity for these children. Anderson,[19] football coach at Holy Cross and formerly at Iowa University, has pointed out that touch football for immature children probably provides a better training program for future football skill than does tackle football. (About 60% of all injuries occurring in tackle football occur while tackling or being tackled.[20] Such injuries, of course, should be eliminated with adequately supervised touch or flag football.)

"Professional" Preparation

"Competitive athletics at this age develops college and professional stars." While this may occur in some instances, it is more common to find that a boy who is a star at 12 years of age is fed up with the sport at 16 or before. He has already "had it," and the sport has nothing more to offer. This is fortunate for the boy. It is difficult for an individual who has been a star athlete from the age of 12 through college not to develop a warped sense of values and an unrealistic concept of the type of economic and social competition he will encounter after college.

"Good Public Relations"

The last point, that "competitive athletics produces good public relations" needs only the comment that the school, the community—and the sponsor—should find other means of advertising than the exploitation of children.

Recommendations for an Athletic Program

I would like to submit 11 recommendations as a means of giving preteenagers most of the advantages and a minimum of the disadvantages in athletic programs.

1. Competition is an inherent characteristic of growing, developing children. Properly guided, it is beneficial and not harmful to their development.

2. Children should have an opportunity of developing skills in a wide variety of individual and team activities. A sound athletic program in schools should include competitive and noncompetitive sports and play activities.

3. Athletics should offer opportunity for all of the children in the school to participate in some phase of the program. Many teams are better than a few teams. At this age, the "star" system is bad.

4. Opponents should be matched as carefully as possible as to their physical and emotional level of development, as well as to their age, size, and body build. The sports and other activities selected should be those appropriate for their capacities. In many instances this requires the judgment of a physician as well as a coach.

5. Body-contact sports, particularly tackle football, boxing, and wrestling, are dangerous at this age. Touch and flag football are safe games if properly supervised.

6. The best possible leadership should be obtained; volunteers, however well intentioned, should work under professional supervision. Parents should have a voice in the policies and administration of the program.

7. All competitive athletic programs should be organized with the cooperation of local medical organizations. All children should have a thorough physical examination before entering the program and at specified intervals during the program. There should be continuous medical supervision and individual attention for such factors as injury, response to fatigue, individual emotional needs, and undue emotional strain. Ideally, a physician should be in attendance at all games. A minimum requirement should be that he be quickly available. The medical group should be responsible also for teaching health observations to teachers and coaches. (A detailed plan of medical supervision for athletic events has been adopted by the National Joint Committee on Standards for Boy's Athletics and endorsed by the Joint Committee on Health Problems in Education of the National Education Association and the American Medical Association.[21]) Through their role as medical advisor, physicians have been led into important research in this field. Some have also developed an interest which has resulted in their distinguished participation in a variety of sports.[20]

8. Regularly scheduled interschool and intercommunity contests are not recommended for this age group; neither are state, regional, or national tournaments or the bowl, charity, or exhibition type of games. Commercial exploitation in any form is unequivocally condemned.

9. Any athletic program should be so designed as to be of educational as well as recreational value.

10. Provision should be made to include in some phase of the program the child who is either physically or psychologically handicapped. This often requires the active cooperation of private physicians and other specialists.

11. Qualified professional leadership should be supplied. It should be such that highly organized, highly competitive programs are avoided. The primary consideration should be a diversity of wholesome childhood experiences.

A community program should also be based on the same principles. It should be entirely voluntary, without undue emphasis on any one sport and without undue emphasis on winnning. Here again, many teams are better than one.

In making these recommendations, I have drawn freely from a number of publications, particularly the Report of the Joint Committee on Athletic Competition for Children of Elementary and Junior High School Age,[22] the five national conferences on physicians and schools,[23] and a report of the Committee on School Health of the American Academy of Pediatrics.[4] Some of these points may be argued. But they represent the considered judgment of the majority of capable professional educators and physicians who have studied the problem. Until continued and comprehensive objective research has finally settled the points in question, the burden of proof rests with those who disagree.

Summary

It is apparent that today's athletic programs suffer from a lack of competent medical advice and supervision. More objective and qualified medical research is needed. More doctors, interested in children and informed on the basic facts of juvenile athletics, are needed to provide medical supervision for school and community athletic programs for preteenagers. If we as physicians are to work toward our stated goal of leading children to secure, responsible, and well-adjusted manhood and womanhood, here is an area where we must get in and pitch.

1791 Howard St. (26).

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VIRUSES AND CANCER.—I continue to be amazed at the willingness of so many investigators to accept viruses as etiological agents for animal cancers and their unwillingness to consider them of potential etiological importance in cancers of man. It should be recognized that cancer is a biological and not a uniquely human problem. Basic biological phenomena generally do not differ strikingly as one goes from one species to another and I regard the fact, now proved beyond contention, that viruses in the form of specific nucleoproteins can cause cancer in animals to be directly pertinent to the human cancer problem. I believe that the time has come when we should assume that viruses are responsible for most, if not for all kinds of cancer and design and execute our experiments accordingly. Cancer is basically a problem in growth and there is no reason to believe the growth of most human cells is different basically from the growth of most animal cells. Acceptance of the viral etiology of human cancer as a working hypothesis will involve a marked change in attitude on the part of many investigators, but this will be necessary if the right approach and the right design of experimentation are to result. What we do in the laboratory depends in large measure upon what we think.—W. M, Stanley, The Potential Significance of Nucleic Acids and Nucleoproteins of Specific Composition in Malignancy, *Texas Reports on Biology and Medicine*, Fall, 1957.

ORGANIC AND ORGANIZATIONAL ASPECTS OF SCHOOL ADJUSTMENT PROBLEMS

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and
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The statistics of a public school system showed that 5% of the children failed in a given year. In some instances no reason could be found for the difficulty, but in general there was a preponderance of birth injuries or severe postnatal infectious disorders, such as encephalitis, or severe cerebral episodes connected with the acute exanthemas or postnatal trauma. Pediatric and psychiatric examination revealed a fairly common picture of hyperactivity, excessive pressure of speech, insecurity and anxiety, immaturity of reaction, and fright in the examining situation. Electroencephalographic and neurological evidence of brain damage was found in a large percentage of 181 children so examined. After thorough individual evaluations, a systematic study was made of the effects of treatment, which consisted of psychotherapy for both child and parents, specific speech and reading therapy, and the use of certain drugs. Rauwolfia, reserpine, certain anticonvulsants, and a placebo were used in four groups of 69, 102, 44, and 31 children respectively. The best results, under the conditions of the experiment, were obtained with Rauwolfia, which gave improvement in 63 (91%) of the 69 children, but it is emphasized that the drug therapy alone was not responsible for the total improvement. Many children who now fail constantly in school can be saved for society if coordination can be achieved by interested parties in the community. The private physician should become a leader in undertakings of this kind.

In the past two years we have studied a large group of children with school adjustment problems. The children have come with problems of failure in class, specific reading and speech disturbances, and personality difficulties while in the school. The diagnostic procedures have consisted of (*a*) pediatric, neurological, and psychiatric examination, (*b*) specific reading, speech, and intelligence testing, and (*c*) electroencephalographic determinations. Almost without exception, the children have presented a definite clinical picture which, besides the specific school problem, has included hyperirritability, anxiety, fright at situations which are normal for other children, failure to adjust to their associates in school, disobedience, temper tantrums, and, in many cases, bizarre behavior. Their school behavior has been such that it was not possible for them to integrate into a normal school routine. Etiologically, they showed a preponderance of birth injuries or severe postnatal infectious disorders, such as encephalitis, or severe cerebral episodes connected with the acute exanthemas or postnatal trauma to the central nervous system. In some instances, no etiological reason could be found for the child's difficulty. In many cases a severe psychiatric disturbance existed in the parents. Sources of referral of these children in the main has been from private physicians, but some came from a local college reading and speech clinic and some came from the public school system.

Diagnostic Observations

Pediatric Examination.—Pediatric examination in the main revealed only one or two interesting points. Many of these children have mixed dominance, that is, they are either left-eyed and right-handed or vice versa. However, this mixed dominance has beeen accompanied by strephosymbolia in only a few of the children. A small percentage showed neurological findings of a localizing nature, such as spasticity, choreoathetosis, paresis, and ocular muscular defects. In the main, however, the vast majority of these children have been normal on physical examination except for the almost universal hyperactivity and excessive pressure of speech, anxiety, and fright in the examining situation. The children all appeared immature in their reactions. This clinical picture, once observed, is so striking as to be almost diagnostic of the child's difficulties before any history is taken.

Read before the Section on Pediatrics at the 106th Annual Meeting of the American Medical Association, New York, June 5, 1957.

Psychiatric Examination.—Psychiatric examination revealed a fairly common picture. The children were insecure, and some were mentally retarded. Many more were badly frightened, existing in a home environment in which persistent disciplinary measures had been almost completely absent. It is interesting to note that this absence of any firm disciplinary policy has resulted almost entirely from the fact that the parents have been advised that the child is abnormal and have failed because of their feelings of sympathy, guilt, and frustration, among other things, to embark on any normal disciplinary

control of the child. This failure by the parents has contributed a great deal to the difficulties that the child experienced.

Electroencephalography.—Findings in electroencephalograms of 181 children are summarized in table 1. Of these recordings, 15.47% have 14 and 6

TABLE 1.—*Electroencephalographic Findings in 211 Children*

14 and 6 per sec. Positive Spikes	Other Abnormality	Experimental Group (181 Children), %	Control Group (30 Children), %
+	—	15.47	16.6
+	+	43.09	3.4
—	+	17.13	...
—	—	24.31	80.0

per second positive spikes without other electroencephalographic abnormalities, whereas 43.09% had 14 and 6 per second positive spikes with other abnormalities on the electroencephalogram. Other abnormal rhythms without 14 and 6 per second positive spikes occurred in 17.13% of the children; these abnormalities included slow waves, paroxysmal slowing, fast activity, area spikes, amplitude asymmetry, and generalized seizure activity. A few children showed spike and wave abnormalities. The total number with abnormal rhythms included 75.69% of the group. Normal electroencephalograms were seen in 24.31%.

Electroencephalograms of a control series of 30 children who had no difficulties in school or home adjustment also is shown in table 1. Of these, 80% had normal electroencephalograms, 16.6% showed the presence of 14 and 6 per second positive spikes without abnormality, and 3.4% had abnormal rhythms. Gibbs and Gibbs[1] have reported that, in this age group, the incidence of abnormal 14 and 6 per second positive spikes alone was approximately 12% and the incidence of other abnormal rhythms 2% or less.

Treatment

After a thorough evaluation, the treatment of the children consisted of psychotherapy for both the child and the parents, specific reading and speech therapy under the guidance of a reading and speech clinic, and the use of tranquilizing drugs[2] and other anticonvulsant drugs to reduce the tensions which had been interfering with the educational process in the children. The results of treatment are summarized in table 2.

Results

In assessing the results, we are aware that drug therapy alone was not responsible for the total improvement seen in the children. We attempted, however, to determine as closely as possible how much effect the drugs had on relaxing the children's tensions so that the children were thereby enabled to respond to the specific psychotherapeutic and educational methods of treatment. In table 2 it will be seen that 246 children were treated with one or the other of the various drugs. Rauwolfia was used in the treatment of 69 children. Of those treated, 91.3% showed improvement, 5.8% were not improved, and 2.9% became worse with the drug therapy. Reserpine was used in the treatment of 102 children, of whom 74.5% were improved, 15.7% were not improved, and 9.8% became worse. Other anticonvulsants, such as diphenylhydantoin (Dilantin) sodium, phenobarbital, acetazolamide (Diamox), and phenacemide (Phenurone) were used in the treatment of 44 children. Of these, 59.1% were improved, 31.8% were not improved, and 9.1% became worse. A group of 31 children who had been previously on therapy with one of the above drugs was placed on placebo medication. Of these, 6.4% seemed improved over the previous medication, 22.6% were not improved, and 71% became worse when they were taken off therapy with the preceding tranquilizing drugs and were given a placebo.

TABLE 2.—*Effect of Specific Drug Therapy in Children with School Adjustment Problems*

Drug	Effects: Improved No.	Improved %	No Improvement No.	No Improvement %	Worsened No.	Worsened %	Total in Group
Rauwolfia (Raudixin) ..	63	91.3	4	5.8	2	2.9	69
Reserpine	76	74.5	16	15.7	10	9.8	102
Anticonvulsants	26	59.1	14	31.8	4	9.1	44
Placebo	2	6.4	7	22.6	22	71.0	31

Comment

The diagnosis in the child with school adjustment problems is a complex one. To evaluate these children properly, a complete analysis physically, psychiatrically, neurologically, and educationally is required before a program of rehabilitation can be instituted. Most of the children presented in this study came to us from physicians in general practice who recognized the necessity for a more thorough examination of the child than had been previously done. A proper diagnostic approach to these children involved the utilization of many services, medical and otherwise. Any attempt to estimate the potentialities and the possible therapy in these children is obviously doomed to failure unless there is coordination among the various diagnostic services. In other words, the private physician and the medical specialist must have liaison between themselves, and, in turn, they must develop a means of liaison with the various special educational diagnostic clinics which deal with the determination of intelligence and with specific reading and speech diagnostic clinics. Without such liaison among all members of the group that are concerned with the child, no adequate conclusions as to the child's potentialities and treatment can be reached.

In the evaluation of the drug therapy reviewed above, some conclusions are possible. In the main, Rauwolfia, which represents the whole root of Rauwolfia serpentina, gave the best over-all results

therapeutically. Reserpine gave less frequent results but still showed a good response. Phenobarbital, diphenylhydantoin, acetazolamide, phenacemide, and the other strictly anticonvulsant drugs in isolated instances induced improvement in the child but in general were not as satisfactory as were the tranquilizing drugs. The placebo studies showed quite clearly the value of tranquilizing drugs in the treatment of these children. Throughout the entire study it was obvious that no single method exists for diagnosing or treating all children with severe school adjustment problems. The necessity for liaison between some rather diverse groups in the community has been demonstrated. When this liaison has been perfected, the results for the children have been excellent. In most communities no single program makes this liaison possible. In Rockford, Ill., within the past few months this defect has been attacked by the formation of a committee within the school system which has been designated the "Committee of the Whole Child." This committee consists of the superintendent of the schools, four members of the medical society, and the members of the school system who are primarily concerned with specific problems. Its purpose has been to review the diagnostic work on all children within the school system who are failing. Once a month the records of such children are reviewed by this committee with two objectives in mind: (1) to criticize and evaluate the diagnostic procedures that have or have not been done on a given child and to remedy the omissions, and (2) to provide suggestions for future treatment of the child. Where further therapeutic procedures are suggested, a notification is sent to the private physician, to the teacher, to the principal of the school, and to the special school departments which might be involved in the rehabilitation of the child.

The importance of this activity is substantiated by the statistics from our public school system, where it has been shown that 5% of the children in the entire system fail in any given year. The vast majority of these failures occur within the first six years of the child's school life, and it is probable that most of these failures occur within the first three years, during which time the child is acquiring his basic learning skills. Someone must become the leader in every community to coordinate the work of the various individuals and agencies whose help is necessary for these children. The private physician to whom the family brings all of its problems is the one who should spear-head the attack against this problem, which involves such a significant percentage of the children under his care. It is the professional and moral responsibility of physicians to see that more adequate means for the diagnosis and treatment of children with school adjustment problems are devised in their own communities. As a physician embarks on this type of program, he should constantly remind himself that alone he cannot achieve the necessary rehabilitation in these children. His every effort, therefore, must be extended towards developing a community-wide endeavor, in its fullest sense, for the solving of this problem.

Summary

In 181 school children with severe school adjustment problems, electroencephalographic and neurological evidence of brain damage was found in a large percentage of the cases. The use of tranquilizing drugs to reduce the almost universal tension in these children was satisfactory.

The diagnosis and treatment of school adjustment problems is not exclusively a medical problem but demands a working coordination of the private physician, the medical specialist, and the educational specialists in the school. When such coordination can be achieved, many children who now fail constantly in school and become a burden to the community in general may be rehabilitated and take a functional place in their society. The private physician should become a leader in this worthwhile project.

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THE AZYGOS VEIN.—It is not generally appreciated that the azygos vein may be seen on the posteroanterior roentgenogram of the normal chest in up to 15 per cent of cases. Ignorance of this fact has led on occasion to a misinterpretation of the image of the azygos vein—an erroneous diagnosis of mediastinal tumor being made. In addition, abnormal dilation of the azygos vein may have diagnostic significance. For these reasons, familiarity with the roentgenographic appearance of this vascular structure is important. . . . Tomograms usually outline the azygos vein beautifully. Not only is the shadow of the vein sharply defined but its relationship to the trachea and right upper lobe bronchus is easily seen.—Sol Katz, M.D., The Azygos Vein, *GP*, January, 1958.

DISORDERS OF THE ABDOMINAL AORTA

CLINICAL OBSERVATIONS ON SURVEY OF TWO HUNDRED SEVEN CASES

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Evidence of pathological changes in the abdominal aorta was found in 207 patients out of a series of 3,000 consecutive cases of vascular disorders. The group included 107 patients who had x-ray evidence of calcification without evidence of impaired circulation and 100 patients with both subjective and objective evidence of occlusive disease. Among the 100 there were 36 with evidence of complete occlusion of the abdominal aorta. In such patients, extensive atrophy of the muscles of the thigh was occasionally seen, but it was not frequent in this series. Intermittent claudication was a frequent complaint; impotence was rare. Since occlusion of the aorta is insidious in onset, circulatory function should be studied by means of oscillometric tracings, histamine tests, plantar ischemia observations, and determinations of venous filling time and skin temperature. Aortograms can be made when indicated. A routine soft-tissue x-ray of the abdominal aorta is recommended. The detection of early changes is desirable because even minimal areas of calcification may become foci of thrombosis.

Disorders of the abdominal aorta may occur in various ways, such as embolic occlusion ("saddle" thrombus) at the bifurcation, aneurysm, and structural changes of the walls with particular reference to arteriosclerosis and atheromatosis, with or without thrombosis.

This presentation will be confined to the clinical aspects of pathological changes which take place in the walls of the abdominal aorta, with emphasis on the atheromatous type. The possibility of extensive thrombosis of the abdominal aorta was first discussed by Leriche in 1940.[1] Subsequently, Morel[2] suggested that those cases of thrombotic occlusion of the aorta at its bifurcation be designated as the Leriche syndrome. He described it as a thrombotic disease with a long course of symptoms, consisting of extreme fatigue of the lower extremities, claudication, impotence, global atrophy of both lower limbs, pallor of the legs and feet, absent pulses, and "no trophic changes in the skin or nails." Their description of the pathological process is acceptable. However, some of their conditions have been challenged. This will be mentioned in more detail when symptoms and clinical course are discussed.

Abdominal aorta disorder has stimulated the interest of investigators, angiologists, surgeons, and roentgenologists. Their contributions have been helpful in attempting to clarify some of the problems entailed in this condition. Of the various types of involvement (arteriosclerosis, atheromatous lesions, and superimposed developing thrombosis), any one condition or a combination may exist, from minimal to extensive or complete occlusion. Some patients may have extensive thrombosis with occlusion which will not be revealed by ordinary x-ray studies. On the other hand, x-rays may show calcification of the walls with little or no impairment of the peripheral blood supply.

Segmental occlusion may occur at various sites. It may be evident in the abdominal aorta and not in the lower extremities. In contrast, the large trunks, such as the iliacs and femorals, may be involved without the disease necessarily present in the abdominal aorta. Definite diagnostic methods in reaching a conclusion will be discussed later in the paper.

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Survey of Cases

In a survey of 3,000 consecutive cases of vascular disorders, 207 patients were found to have evidence of pathological changes in the abdominal aorta. They were arranged into two major groups according to clinical findings. Group 1 consisted of 100 patients who had definite evidence of occlusive vascular disease based on subjective and objective findings and confirmed by circulatory function tests. This group was further divided into three subgroups: (1) patients with positive x-ray findings, 47; (2) patients whose x-rays were negative for calcification, 11; and (3) patients for whom no x-rays were available, 42. Analyses were made according to age, sex, and symptoms and will be discussed below. Group 2 included

107 patients with x-ray evidence of calcification but in whom evidence of an impaired circulation was lacking.

An additional survey was made of 36 patients in group 1 who presented evidence of complete occlusion of the abdominal aorta. The results of the analysis of this special group will be compared with those of the milder grades and will be discussed under the heading of symptoms, clinical course, and x-ray findings.

Etiology and Pathology

Arteriosclerosis has been mentioned as the common factor in aortic thrombosis. On the other hand, more stress has been placed on the presence of an atheromatous process. Without getting too involved in the academic discussion, it may be pertinent to clarify the terms of arteriosclerosis and atheromatosis.

If arteriosclerosis is used in the broadest sense, it might be acceptable. However, it may be advisable to make some distinction between these two terms. Arteriosclerosis implies calcification with the deposits primarily in the media. It is an accepted fact that patients may have calcification of large arterial trunks without necessarily having obstruction of the lumen and may have, moreover, good pedal pulses and normal function tests. Atheromatosis, on the other hand, implies pathological changes taking place in the intima with proliferation of the cells, thickening of the inner wall, gradual encroachment upon the lumen, and further developmental changes taking place on this thickened area. Arteriosclerosis connotes a degenerative process, whereas in atheromatosis the problem appears to be more along the lines of metabolic biochemical disturbances. Since atheromatous placques contain a high percentage of cholesterol and lipids, these substances have been given a prominent place in the etiology of thrombosis. There are other factors or theories that have been offered,[3] namely, imbibition, penetration, anoxia, disintegration of the internal elastic fibers, changes in the vasa vasorum with impairment of nutrition of the intima, possible role of cholesterol, S_f molecules, cholesterol/phospholipid ratio, lipoproteins, endocrine disorders, hypertension, vitamin deficiency with particular reference to pyridoxine, and derangement of the collagens. In addition to the above, the following factor deserves consideration.

Sludging of blood (intravascular agglutination) has been discussed by Knisely and Warner [4] as a contributory factor in the development of thrombosis. They claim that sludged blood flows more slowly than unagglutinated blood and that masses of sludge settle down from slowly moving blood to the lower sides of vessels during life. The settled masses sometimes cement together and may form a large mass which, at times, clings to the vessel wall and encroaches on the lumen.

Impallomeni [5] studied the arterial endothelium of arteries taken from limbs amputated for gangrene. He reported that there were changes in the endothelium, with the intercellular cement substance being in some instances inconspicuous and with additional deposits of fibrin. This stage was later followed by disintegration of the endothelial layers in the arteries. Even in the absence of thrombosis, the endothelium had almost completely disappeared.

A recent investigation of uric acid levels has revealed an increased incidence of hyperuricemia in patients with vascular disturbances. As such, it deserves a comparable status with hypercholesterolemia.[6] This does not necessarily imply that the uric acid is responsible for these changes or that these patients have gout. However, it does indicate that metabolic disorders may, in some way, be related to the development of thrombosis.

Toxic infectious substances have been reported as causes of abdominal aorta thrombosis. This is particularly true when it occurs in the younger age groups. Patients with a history of rheumatic fever are particularly liable to develop arterial thrombosis. Syphilis [7] also has been mentioned as a cause.

Site.—Another interesting fact is the site and progressiveness of a developing thrombosis. Some contributors have indicated that the thrombotic process starts in the iliac or iliofemoral arteries and extends upward, passing the bifurcation and involving the abdominal aorta. They have observed such cases both at autopsy and during surgical procedures. In some cases, atheromatous placques may extend into the aortic cavity without necessarily being attached to the intima.

The question as to the primary origin has been discussed pro and con. Some believe that the condition begins more frequently in the iliac arteries near the bifurcation and, as the condition progresses, that it extends upward into the abdominal aorta and may extend as high as the origin of the renal arteries. Others are inclined to believe that the process may start at the bifurcation and the pathological process extends downward, involving the iliacs. On the other hand, one may find various levels involved. It is quite possible that cases may be found where either of the above-mentioned conditions exist. It has also been noted that evidence of periarteritis [8] has been found about the thrombosed aorta, with adhesions embracing the neighboring lymphatics.

Modus Operandi.—The modus operandi of the thrombosis has been aptly described by Duguid.[9] He emphasized the gradual development of mural thrombi, stating that fibrin may be deposited on the internal surface of the artery. It becomes covered with endothelium and then incorporated in the intima. The organization of these mural

thrombi is retarded, and they may be compressed into masses of hyaline substance. In time, these undergo fatty changes and subsequently are recognized as atherosclerosis. The larger mural thrombi may be more easily seen. At first, they may appear to be merely a thickness of the vessel walls, but the recurring successive layers of fibrin produces thickening of the inner wall and a gradual narrowing of the lumen of the vessel. Later the thrombotic process may undergo degenerative changes with destruction of the inner surface, and deposits of calcium may appear. In some cases, the involvement is so extensive that it is difficult to conceive how the circulation was maintained without more definite manifestations in the lower extremities and more numerous episodes of embolic occlusion during life.

Symptoms and Signs

Occlusion of the abdominal aorta has an insidious onset. It is difficult to give definite facts as to how long it takes from the actual beginning of the atherogenesis until it reaches the stage where the lumen is encroached on. The fact that so many of the cases in group 2, where there was x-ray evidence of calcification in various degrees without symptoms or signs, further emphasizes this point. The development of symptoms will depend on the rapidity of the pathological changes in the aorta and the formation of an adequate collateral blood supply. This may take a matter of years. Any effort to become more specific as to the lapse of time necessary for this progressive development must be purely speculative.

Symptoms.—An analysis of symptoms of 100 patients with clinical evidence of some degree of aortic involvement is found in table 1. The most common symptom was claudication. It will be noted that 15 patients complained of claudication

TABLE 1.—*Analysis of Symptoms in One Hundred Patients with Clinical Evidence of Pathology of Abdominal Aorta*

	No. of Cases	Claudication: Hip-Thigh	Calf	None	Pains	Fatigue	Impotence	Paresthesia
Positive x-ray	47	5	31	11	30	25	...	35
Negative x-ray	11	3	6	2	4	4	...	9
No x-ray	42	7	26	9	21	17	2	20
Total	100	15	63	22	55	46	2	57
		78						

of the muscles in the hip or thigh and 63 complained of cramps at the calf level. However, some of the 15 patients mentioned above also had cramps in the legs. The total incidence of claudication at one level or other was 78%. Although the incidence of claudication in the muscles of the hip and thigh was much lower, this does not detract from its significance, because when it is present it more definitely points to an obstructive lesion higher up.

Of the other symptoms, the complaint of numbness and paresthesia occurred in 57 patients of the 100 in the group; 55 complained of pains. Fatigue was mentioned in 46 of the cases. Ordinarily, one would expect a higher incidence of this symptom among these patients.

Impotence, stressed by Leriche and others, was an uncommon complaint among our series. Only 2 of 67 males were so recorded. This concurs with the findings of DeWolfe and associates [10] and Covey [11]

TABLE 2.—*Analysis of Clinical Findings in Thirty-Six Cases of Severe Occlusion of the Abdominal Aorta*

		Cases: No.	Cases: %	Remarks
Age, yr.	<30	8	22.2	Range, 29-70
	30-59	15	41.7	
	60-70	13	36.1	
Sex	M	29	80.5	Ratio (M:F), 4:1
	F	7	19.5	
Symptoms	Claudication: hip-thigh	5	13.9	Total claudication incidence, 80.5%
	calf	24	66.6	
	Pain	23	63.9	
	Paresthesia	18	50.0	
	Fatigue	18	50.0	
	Impotence	0	0	
Circulatory function studies	Oscillometer readings, 1 degree or less	36	100.0	
	Histamine response			
	Marked delay	28	90.3	31 cases
	Moderate delay	3	9.7	studied
	Positive plantar ischemia	32	88.8	
	Delayed venous filling time	30	83.3	
	Skin surface temperature			10 cases
	Rise to 30° or more	9	90.0	studied
	Less than 30°	1	10.0	
Soft-tissue x-ray	Marked calcification	6	35.4	Total calcification incidence, 70.6%
	Moderate calcification	3	17.6	
	Minimal calcification	3	17.6	
	Negative x-rays	5	29.4	

that this symptom need not be considered so prominently as a guide for diagnosis, as was originally stated.

It may be of interest to compare a detailed analysis of observations in the 36 patients that showed evidence of marked occlusion of the abdominal aorta (table 2). In this latter group, the results were as follows: 29 (80.5%) complained of claudication with a marked predominance at the calf level; 23 (64%) of pain; and 18 (50%) of numbness, paresthesia, and fatigue. It may be noted that the incidence of the symptoms were generally higher than in the over-all group.

Signs.—On inspection, it was noted that the nutrition of the feet and legs is not so disturbed as one would expect, judging from the clinical evidence of a markedly impaired circulation. Pallor was frequently noted. Patients with complete occlusion of the abdominal aorta may show evidence of global atrophy in the muscles of the thighs, but it was not a frequent finding in this series.

On examination, the pedal pulses were usually absent. However, in some of the patients, they were present on one side or the other, depending on the completeness or incompleteness of the pathological changes in the abdominal aorta. Femoral pulses also showed varying degrees of diminution to absence. In patients with severe occlusion

(table 2), the femoral pulses were absent bilaterally. However, in the incomplete cases, one side may show a fair pulsation.

Examination Results

Circulatory Function Studies.—Circulatory function studies performed in this survey consisted of oscillometric tracings, histamine test, plantar ischemia observation, venous filling time, and skin surface temperature observations. Results of these findings confirm the presence of some degree of impairment of the arterial circulation.

The oscillometric tracings were subnormal at both thigh and calf levels. In a fair percentage of these patients, the thigh readings were less than that of the calf. This certainly was not the usually anticipated pattern. Normally, the thighs show a higher reading than the legs. It was hoped that this could be interpreted as a diagnostic aid in detecting occlusion of the abdominal aorta. Although this finding was present in many cases, it was not found consistently enough to warrant its acceptance as a significant factor in differential diagnosis. The histamine response showed varying degrees of delay from slight to marked. Similarly, the results of other studies showed evidence of impairment but to a variable degree.

TABLE 3.—*Relationship of Aortic Calcification to Aortic Occlusion**

	Aortic Occlusion		No Occlusion	
Degree of Aortic Calcification	No.	%	No.	%
Minimal	7	22.6	24	77.4
Moderate	18	29.2	47	70.8
Marked	22	37.9	36	62.1
Total	47		107	

* Survey of 165 cases with x-ray findings from groups 1 and 2. (Eleven patients with definite occlusion, but no calcification, are not here included.)

In the detailed study of the patients who had complete aortic block, the results of the function studies were more uniform, as seen in table 2. The oscillometric readings at thigh level were 1-degree spike or less, and at calf level either a flat line or a wavy line was usually seen. Histamine response showed a preponderance of the patients (78%) to have marked bilateral delay of both the wheal and flare reactions. The remainder showed a definite impaired result. Plantar ischemia was almost universally present. Venous filling time was definitely delayed in all.

Skin surface temperature studies, usually looked on as the most dependable and most reliable test of circulatory function, must be carefully evaluated in patients with abdominal aorta thrombosis. In 10 patients with complete occlusion, 9 showed a marked rise, reaching about 30 C. In five of these nine the temperature rose even above the level of 31.5 C. The 10th patient showed a rise of only 4 C, to a maximum of 28.8 C. In this particular group, there may be a rise of skin temperature readings to normal or close to normal levels (30-31 C). This finding demands some explanation. It may be interpreted that the occlusion is high up in the abdominal aorta and that the other large arterial trunks, iliacs and femorals, are not necessarily involved. If further studies on a larger series will confirm this fact, it may be useful in selecting those patients with segmental occlusion of the abdominal aorta as likely prospects for surgical intervention.

X-ray.—As mentioned above, roentgenologists have been interested in abdominal aorta disorders and have attempted to clarify the role of x-rays in detection of sclerosis and atheromatosis.

In this survey of 207 cases, 165 of the records had soft-tissue x-ray reports of the abdominal aorta and of the vessels in the feet, legs, and thighs. Aortograms were not made routinely because of the liability of side-effects but were performed when indicated.

The results of the x-ray studies were analyzed as to the degree of calcification and further compared with the clinical picture of thrombosis and degree of occlusion of the abdominal aorta. Age and sex were similarly observed in their relationship to the calcification.

In group 1, the 100 patients with clinical evidence of aortic occlusion, 47 (81%) revealed calcification, whereas 11 had no evidence of calcific sclerosis. In group 2, which comprises 107 patients with no clinical evidence of occlusion, there were varying degrees of calcification. This poses the problem of the relative value of x-ray in diagnosis of abdominal aorta disorders and how it can be evaluated.

In order to gather more information on this particular angle, 36 cases of marked occlusion of the abdominal aorta were reviewed in greater detail (table 2). In these cases, 17 patients had been x-rayed: 12 (70.6%) had some degree of calcification, and 5 (29.4%) had negative reports. The absent finding in the latter five patients need not necessarily preclude a diagnosis of occlusion. It merely indicates that arterial thrombosis may be present and will not be detected by x-ray unless calcific deposits have been superimposed on the pathological process.

Conversely, the relationship of degree of aortic calcification to the presence of occlusive phenomena was tabulated (table 3). Of the 58 patients with marked x-ray findings, 22 (37.9%) had evidence of occlusion and 36 presented none. In the moderate calcification group, 18 (29.2%) of 65 patients had signs of aortic block, and of those with minimal deposit, 7 (22.6%) of 31 had some degree of aortic occlusion. From the above findings, and not forgetting the 11 cases of occlusion with negative x-ray findings, it would seem that a corollary can be made, namely, although calcification in itself

does not necessarily mean occlusion, the greater degree of calcific deposit the greater the chance of the existence of thrombosis.

In the over-all survey, 14 patients were found to have segmental aortic calcification, i. e., positive x-ray evidence of calcification in the abdominal aorta with negative x-rays of the vascular structures in the pelvis and lower extremities. Of these, three had definite evidence of aortic occlusion, two showed occlusion of a questionable grade, and nine presented no clinical evidence of aortic block. From this small series, it appears that there is no direct correlation between segmental calcific deposits and clinical aortic occlusion.

Age and sex will be discussed in the succeeding portion of the paper. However, a brief word concerning the relationship of x-ray findings to these factors is in order here. As seen in table 4, the percentage of positive calcification increases tremendously above the age of 50 and is almost 100% above the age of 60. Since calcific deposits are associated with degenerative changes, this finding is certainly not unexpected. Male-female ratio is approximately 2:1 in those patients with calcification and approximately 1:1 in those with negative x-rays. While this is a notable difference, it does not appear great enough to have clinical significance.

Age, Sex, and Race

Age.—It is conceded that thrombosis of the abdominal aorta may occur about one decade earlier than expected in individuals with thrombosis with generalized arteriosclerosis. The age incidence in group 1, in which there are 100 cases with varying degrees of pathology, was analyzed (table 4). There were 22 patients below the age of 50 years. Thirty-four were in the sixth decade, 33 in the seventh, and 11 in the eighth.

In the special series of 36 patients (table 2) with complete occlusion, 8 (22%) were below 50 years of age; 15 (41.7%) were in the sixth decade; and 13 (36.1%) were in the seventh decade. The youngest male was 29 years old, and the youngest female was 36. Evidently, there was very little difference in the age incidence between patients with severe cases and those with less involvement. However, it may be of interest to note that this condition may be found in the younger age groups. Leriche and Morel [12] mentioned that their youngest patient was 29 years of age, and DeBakey [13] reported that in his series the ages ranged from 33 to 63 years and that 70% of the patients were in the fifth and sixth decades. In the series of Szilagyi and Overhulse,[14] the ages ranged from 45 to 61 years.

Sex.—In most of the contributions on the subject of occlusive disease of the abdominal aorta, the predominance of males over females was stressed. Leriche and Morel [12] mentioned that this condition was found mostly in males. In DeBakey and coworkers' [13] series of 22 patients, all were white males. The topic of sex influence in peripheral vascular disorders is interesting. In thromboangiitis obliterans, only 1 or 2% of the cases has been reported as occurring in females. The explanation is most likely along the lines of a protective influence of the gonads. In group 1 (100 cases of varying degrees of pathological changes in the abdominal aorta), the sex ratio of males to females was 2:1 (table 4). However, in the special group of 36 patients with advanced pathology, there were 29 males and 7 females, a ratio of 4:1. Petersen,[15] in a survey of 220 patients (101 females and 119 males) based on x-ray studies, reported that pathological changes in the aorta but not necessarily occlusion of the abdominal aorta may occur as frequently in females as in males.

Race.—The consensus of the contributors on this subject is that this condition has been found among whites. No Negro patients were reported in our series. This is similar to the status of race in thromboangiitis obliterans.

TABLE 4.—*Analysis of Age and Sex in 100 Patients with Some Degree of Pathology of Abdominal Aorta*

X-ray	Age						Sex		
	<40	40-49	50-59	60-69	70-79	>80	M	F	Ratio (M:F)
Positive	3	5	20	14	3	2	31	16	1.9:1
Negative	1	5	4	1	...	...	6	5	1.2:1
None	1	7	10	18	6	...	30	12	2.5:1
Total	5	17	34	33	9	2	67	33	2:1

Diagnosis

Because of various degrees of involvement, it is advisable to discuss diagnosis in four groups: (1) extensive thrombosis approaching complete occlusion of the abdominal aorta, (2) evidence of structural changes with incomplete occlusion, (3) x-ray evidence of calcification but no impairment of the circulation, and (4) iliofemoral artery thrombosis.

Thrombosis Approaching Complete Occlusion.—The diagnosis will be made from the clinical picture, which entails symptoms, signs, the various tests for circulatory function, and x-rays. The symptoms and signs will be conditioned by the extent and degree of involvement, the proportional development of an adequate collateral circulation, and the duration of the disease.

Briefly, the diagnosis of occlusion of the abdominal aorta may be made in comparatively younger age groups (fourth and fifth decades) and probably in white males. The chief complaints are marked fatigue coming on rapidly and claudication, more commonly found in the calves; when claudication involves the muscles in the thighs and buttocks it is highly significant.

The presence of global atrophy and the striking preservation of nutrition of the distal parts, despite the over-all clinical picture of a markedly impaired circulation, deserves special consideration. Sex im-

potence, when present, is significant. However, it is not so common a complaint as has been originally emphasized.

Examination will reveal absent or markedly diminished femoral pulses and absent pedal pulses. The various function tests will indicate that there is a markedly impaired circulation. A possible exception to the rule is the skin surface temperature. In some cases, the skin temperature after nerve block may rise to normal levels. This may be interpreted as presence of an extensive block (higher up) in the abdominal aorta but the large arterial trunks are not involved.

X-ray is a helpful procedure in making a diagnosis. In patients with clinical evidence of extensive thrombosis, a positive finding of calcification will confirm the diagnosis. However, in some definitely proved cases of occlusion x-ray may not reveal calcification.

Incomplete Occlusion.—The recognition of the various degrees of involvement of the abdominal aorta, or the so-called "incomplete" forms, is important. In this group of patients, the symptoms are not necessarily so marked or striking. These patients complain of fatigue and claudication. The claudication is likely to involve the muscles in the legs. The sex ratio is less apt to show the predominance of males over females. The circulatory function tests indicate a markedly impaired circulation, out of proportion to the degree of symptoms or complaints. The pedal pulses are invariably absent. The femoral pulses may be diminished or absent and need not show the bilateral impairment as seen in the more severe forms. X-ray may show calcification of the abdominal aorta and the larger trunks. In the vast majority of cases, x-ray will show varying degrees of calcification.

Calcification Without Circulatory Impairment.—The only evidence of pathology in the abdominal aorta in our patients with calcification without circulatory impairment was revealed by x-ray. There were 107 patients with varying degrees of calcification but no definite findings of an impaired circulation. These patients may be considered as possible candidates for future developments in the abdominal aorta. Petersen [13] reported, "If a roentgen examination shows calcareous shadows in the aorta, it may usually be concluded that atherosclerosis is present in the intima." Positive x-ray findings are particularly significant in individuals who are hypertensive, in diabetics, and in patients who have high blood levels of cholesterol or uric acid. These groups may eventually be designated as having potential cases of abdominal aorta thrombosis. As such, routine examination of the abdominal aorta is recommended. This applies to the soft-tissue technique and not aortograms, which should be performed only when indicated. The early recognition and management of such cases may eventually lead to instituting measures of preventive medicine.

Iliofemoral Thrombosis.—Patients with iliofemoral artery thrombosis usually complain of fatigue and weakness in the extremities. The onset is gradual. Claudication of the calf muscles is a common complaint, as is coldness and numbness of the involved limb or extremities. This is frequently unilateral, and, when bilateral, one side is usually involved more than the other. There is a tendency for trophic changes in the distal parts. Females may be involved as well as males. This condition usually appears in an older age group than that mentioned for the occlusive abdominal aorta type of involvement. The tests for circulatory function will indicate a markedly impaired circulation in the involved extremity. X-ray may and may not reveal calcification of the involved vessels, depending on the etiological background. If the background is of arteriosclerosis, calcification usually may be seen. In these cases, skin surface temperature studies will be more apt to show a failure to reach normal levels. When indicated, direct arterial visualization or aortogram may be performed to definitely localize the site of the pathological area if surgery is contemplated.

Differential Diagnosis.—The various conditions to be excluded in differential diagnosis depends on the site indicated by the patient's complaints. If it is in the hip, as observed in some cases, then the question of a bursitis or neuritis must be excluded. Similarly, hypertrophic arthritis of the spine or the hip is to be considered.

In most of the patients who have extensive thrombosis or occlusion of the abdominal aorta, the condition may be erroneously diagnosed as a ruptured or displaced intervertebral disk. The differential diagnosis can be readily made by thorough x-ray of the spine and also by the presence or absence of a markedly impaired peripheral circulation.

Another condition to be excluded is thromboangiitis obliterans. This may be suggested when dealing with the younger age groups. In this disease, the history of a "back-log" of severe pains which predominate the clinical picture, the marked preponderance in males (9:1 or even higher), the presence of trophic changes in the tissues, the tendency for gangrene to develop early and progress more rapidly, and the history of preceding episodes of recurring infectious thrombophlebitis should be helpful in making the diagnosis. The skin surface temperature observation will show little or no rise after nerve block.

Summary and Conclusions

A survey of 207 patients with various degrees of abdominal aorta pathology included 100 patients with definite evidence of impaired circulation and 107 patients with x-ray evidence of calcification but no appreciable impairment of the peripheral blood supply.

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The main conditions of etiology and pathology revolve about arteriosclerosis and atheromatosis. The question as to whether the thrombosis begins primarily in the abdominal aorta and extends downward or in the iliac arteries with extension of the process upward has been discussed by various contributors pro and con. It is quite possible that this problem must be considered on an individual basis.

The most frequent symptom of impaired circulation was claudication (78%). This occurred more commonly in the calf; however, when the hip or thigh muscles are involved, this complaint is more significant. Impotence, which has been stressed by some writers, is not a frequent occurrence. The role of x-ray in diagnosis is valuable, as applied to the soft-tissue technique. Aortograms are recommended only in selected cases. Although calcification may not be revealed in some cases of extensive occlusion, the presence of positive x-ray evidence is significant even when minimal findings are present.

There may be a predominance of male over female (4:1) in the patients with evidence of marked occlusion, but in patients with mild cases of pathological changes in the abdominal aorta or with minimal x-ray findings the ratio is considerably less.

Diagnosis of occlusion of the abdominal aorta may be made on the basis of the symptoms and signs suggesting a markedly impaired circulation, but with a striking preservation of the nutrition in the distal parts. Circulatory function tests will confirm the presence of an interference of the blood supply to the extremities. However, a proper interpretation of skin surface temperature studies in some of these cases must be kept in mind.

A routine soft tissue x-ray of the abdominal aorta is recommended and may be helpful in detecting an early case of beginning changes in the abdominal aorta because these areas of calcification, however minimal, may eventually become likely foci of developing thrombosis in the future. This may make it possible to recognize individuals having potential cases of abdominal aorta disorders. This particular group may also supply data for further investigation of atherogenesis and the application of preventive measures in the future.

2007 Pine St. (3) (Dr. Kramer).

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ACUTE PANCREATITIS.—Experience with acute pancreatitis over a 10-year period has been analyzed to evaluate the results of current therapy, and particularly the addition of concentrated albumin to customary treatment. During the same period blood volume determinations have shown marked deficits, in patients with pancreatitis, resulting in earlier and more liberal administration of whole blood. The results indicate that albumin together with whole blood has become the only important addition to the treatment of acute pancreatitis in this hospital during the past 10 years.—D. W. Elliott, M.D., Treatment of Acute Pancreatitis with Albumin and Whole Blood, *A. M. A. Archives of Surgery*, October, 1957.

CLINICAL NOTES

CERVICAL CELL STUDIES—A METHOD OF INCREASING PRODUCTION

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The effectiveness of cervical cell studies for the detection of early asymptomatic cervical cancer, in either the early invasive or the preinvasive stage, has been well documented and is now generally accepted by the medical profession. The major problem at the present time, where large numbers of women are being screened by the cell study method, is the scarcity of trained technicians to perform the laborious task of screening the slides to eliminate the normal and pick out the abnormal slides for further study. The demand for such screeners greatly exceeds the supply and will do so for some time to come. In an effort to evaluate methods of increasing the productivity of available personnel, we decided to determine whether a single slide preparation would approach, in accuracy, the examination of two or more slides from each individual when the technique of visualization of the cervix and the direct endocervical swab was utilized.

Method

Twelve thousand asymptomatic women were evaluated. A moistened speculum was placed in the vagina before any pelvic examination, with lubricant, had been made. Cell specimens were obtained by rotating a nonabsorbent cotton swab in the endocervical canal and immediately preparing duplicate slides. In a relatively few instances three slides were prepared. The slides were immediately fixed in a solution of half ether and half 95% ethyl alcohol. After fixation they were stained after the method of Papanicolaou. The preparations were then screened by trained cytology technicians. Any preparation containing abnormal cells was ink-dotted, and the slides were then examined by a senior technician with considerable experience in cytology. The preparations thought to show abnormalities at this screening were, in turn, evaluated by a pathologist for final decision. It should be emphasized that our approach to such cell studies was not one of diagnosis but rather one of detecting cellular abnormalities which, in our opinion, would warrant further tissue examination. In other words, the reports sent to the physician or to the service or clinic where the specimen was obtained never mentioned the word "cancer." Instead, they contained a statement that abnormal cells were present and that repeat studies, multiple cervical biopsies, diagnostic conization, dilatation and curetage, or any combination of these was advised.

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Results

More than 24,000 slides from 12,000 women were examined. Sixty-one of the patients with abnormal cell studies have subsequently had the diagnosis of carcinoma of the cervix made by tissue examination. Of the 61, 20 had invasive carcinoma and 41 were thought to have intraepithelial carcinoma. In 60 of the 61 cases both slides examined showed abnormal cells, although, on occasion, one slide was considered to be a much better preparation than its mate. It was often noted that the first slide prepared from the swab contained the greater number of cells. In a single case there were abnormal cells on the first slide prepared, whereas the duplicate slide was considered insufficiently atypical to have suggested the need for a biopsy. It is our opinion and the opinion of the screeners that this second slide was deficient in cells and would rightfully have been called "unsatisfactory" had it been submitted as a single slide. The biopsy in this case was diagnosed as intraepithelial carcinoma. In addition to the cases that proved to be carcinoma, a single smear appeared to be effective in detecting cervical abnormalities later proved to be cervical dysplasia by biopsy.

Comment

Our reason for using the endocervical swab technique was based primarily on the fact that technicians can screen specimens obtained in this manner more rapidly than they can aspirations from the vaginal pool. When abnormal cells are found in direct cervical smears they are almost always present in great numbers, which brings to a minimum the problem of interpreting one or two abnormal cells in a cell study. It seems obvious then that a given number of screeners can almost double their productivity, case-wise, if the cell

study consisted of a single slide. For those laboratories in which the goal is similar to ours, that is, to make the examination available to the greatest number of women in an effort to detect the greatest number of cancers, we believe a single smear does not appreciably sacrifice specificity. It should, perhaps, be emphasized that this is true only if the endocervical swab, under direct visualization of the cervix, is used and if adequate preparations for cell studies are insisted on before an interpretation is rendered.

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NEW, PRACTICAL CONCEPT OF HEARING TESTING FOR USE OF THE GENERAL PHYSICIAN

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Hearing loss has long been one of the common ailments affecting man, but only in the last few years has it begun to receive attention commensurate with its importance. The early detection and treatment of hearing loss have, in the past, been difficult to realize because man is able to compensate for moderate amounts of loss and because the precision electronic instruments necessary for accurate tests of hearing have only recently become generally available. At present, a widespread interest in conservation of hearing has been stimulated by the increasing social need for general hearing ability good enough to permit persons to use and enjoy radio, television, and the telephone and by the promulgation of laws which provide for payment of compensation to persons who have lost hearing through occupational hazards.

Techniques for testing hearing have been improved considerably during the past few years, but current testing methods are still too cumbersome to meet growing demands for rapid tests of hearing. One of the most compelling demands is found in schools. Most school systems throughout the country do not have programs for testing the hearing of school children. Yet it is very important that the status of hearing of youngsters be checked adequately and frequently so that early hearing losses may be detected and treated before they have progressed beyond the stage of successful treatment. A rapid, simple, and inexpensive method of testing the hearing of large numbers of individuals is required for any practical large-scale school program of hearing testing. Other groups, particularly pediatricians, general practitioners, internists, and industrial physicians, also stand to benefit from the use of such a hearing test. In our opinion, a noticeable and significant lack of hearing testing exists in the offices of these physicians, probably because it has not been practical for them to provide the trained technicians, expensive instruments, sound-treated rooms, and the time required by current methods of testing hearing ability.

It is the purpose of this paper to describe a rapid, simple auditory screening test. The test was originally developed to determine the status of hearing of persons who work in noisy environments, but it is, we believe, particularly well suited to the needs of schools, general physicians, and others who can help significantly to conserve hearing by detecting early hearing loss.

Rapid Auditory Screening Test

This proposed method of rapid auditory testing grew out of our observation that a large majority of the audiograms of persons with impaired hearing showed the largest hearing loss at 4,000 cps. It appeared to be a reasonable assumption that the hearing loss at any frequency lower than 4,000 cps would not be more than the hearing loss at 4,000 cps. The important frequencies for hearing and understanding conversational speech are 500, 1,000, and 2,000 cps; then, if the threshold at 4,000 cps is within normal limits, hearing for speech will

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also be within normal limits in at least 98% of the listeners. Two programs were undertaken to test the validity of this assumption. First, we analyzed three different groups of existing audiograms. Second, we arranged to have the hearing of 1,500 school children tested, and we then analyzed the results.

Analyses of Three Groups of Existing Audiograms.—For the first program, 1,128 audiograms were selected at random from the files in our office. The causes of hearing loss were diagnosed as follows: (1) otosclerosis, 34.1%; (2) presbycusis, 16.6%; and (3) miscellaneous causes, 59.3%. An analysis of these records showed that 98.24% of all patients who had a 15-db. loss at 4,000 in either ear had no loss larger than 15-db. at frequencies lower than 4,000 cps. If a person has no more than a 15-db. loss, it may be assumed that he has essentially normal hearing.

For the second group, a similar study of the records of 1,749 males who participated in the 1954 Wisconsin State Fair hearing survey was made; this resulted in almost precisely the same percentage figures.

For the third group, audiograms of 1,971 male aircraft employees were analyzed; 99.2% of the audiograms showed no greater loss at any frequency below 4,000 cps than the loss found at 4,000 cps.

Survey of 1,500 School Children in Los Angeles Schools.—With the cooperation and assistance of the Los Angeles Board of Education Health Department, 1,500 children were screened first at 4,000 cps at 15 db. and then by the standard sweep-check method. This method screens at each audiometric frequency at a specified level (in this study, 15 db.). All the hearing failures found by either method were then tested by the usual threshold test. The results of this study indicate that the single-frequency screening method was nearly as accurate as the sweep-check method in this particular series of tests. When the children were screened at 4,000 cps only, 94.9% showed normal hearing; when the sweep-check test was used, 93.9% showed normal hearing. Another similar series of tests, carried out on a different group of school children, showed the reverse of this; the single-frequency screening test disclosed more valid hearing failures than did the sweep-check method. On the strength of these findings, we have concluded that single-frequency screening is equally as accurate as sweep-check screening, the method now used as a standard procedure for screening large groups of school children.

As an extension of this study, 500 of the 1,500 school children were screened at both 2,000 and 4,000 cps to determine if a greater accuracy would result when two frequencies were used. No noticeable increase in accuracy resulted.

Screening at 4,000 cps alone may not always be adequate. Many persons show a slight hearing loss at 4,000 cps. This loss has come to be known as the "4,000-cycle dip" or "notch." In school children, such dips are usually due to a congenital defect that is relatively unimportant in itself. Unless the dip is accompanied by losses at the lower frequencies, it has no significant effect on the child's hearing. Obviously, if 4,000 cps were the only frequency used to screen school children, many of them would be referred to an otologist for examination on the basis of the 4,000-cycle dip. In order to avoid needless referral in these cases, the 2,000-cps tone was added to the screening test for school children. When school children are screened at the two frequencies, the number of needless referrals is negligible.

Uses of Single-Frequency Screening

We feel that single-frequency screening (4,000 cps) is particularly adaptable for use by industry and the military services.

Industry.—Industrial hearing testing programs call for frequent follow-up tests. The purpose of these tests is to determine the presence of a change in hearing level from the level found by the preplacement or initial hearing test. It is well known that most of the hearing loss produced by noise exposure occurs at 4,000 cps. Therefore, if the employees show no change at 4,000 cps, no change at any lower frequency will be expected in 99% of the employees tested. If a base-line audiogram is not essential, the single frequency test can be used as an initial test.

Military Services.—The military services require a rapid auditory test for induction purposes which will divide the personnel into two classes: (1) those with satisfactory hearing and (2) those with unsatisfactory hearing. The single frequency test (4,000 cps) makes it possible to test the inductees rapidly at a specific prefixed level and correctly separate them into these two categories. The military services also have the same general needs as industry. These needs can be satisfied with the single-frequency test.

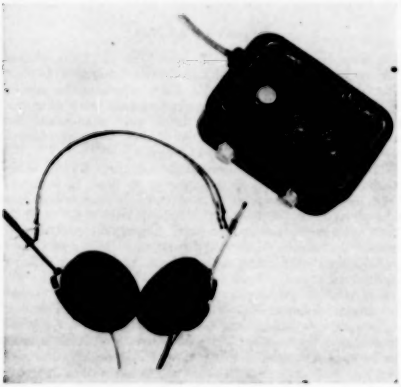
Uses of Double-Frequency Screening

We feel that double-frequency screening tests (2,000 and 4,000 cps) are well suited for use in school testing programs and doctor's offices.

School Testing Programs.—The purpose of a hearing testing program in schools is to detect early hearing losses in the school children. On the strength of the findings presented above, it is felt that when no significant loss is found at 4,000 cps

there will be none found in any of the lower frequencies. It is reasonable then to divide school children into a normal hearing group and an abnormal hearing group. The children with normal hearing will need no further testing until a recheck test is made later at some specified time interval—probably two years. The children with abnormal hearing (those who failed to hear the test signal at a predetermined level, probably 15 db.) will be referred for complete threshold tests. As previously mentioned, it was considered advisable to add 2,000 cps for use in schools to avoid needless referrals. If a child fails to hear at 4,000 cps he is tested at 2,000 cps, and if this tone is heard at 15 db. no further testing is necessary at that time.

Doctors' Offices.—The double-frequency screening test (2,000 and 4,000 cps) provides a rapid and accurate means of detecting the presence of a



Double-frequency model (2,000 and 4,000 cps) of hearing testing instrument.

possible hearing loss during routine physical examinations performed by pediatricians, internists, and general practitioners.

If during a routine physical examination the patient's hearing is tested at 4,000 cps and he responds to the tone at 20 db., his hearing may be said to be within normal limits. On the other hand, if he fails to hear at both 4,000 and 2,000 cps at 20 db., he should be referred for threshold testing to determine the exact status of his hearing.

Advantages

Ordinary quiet rooms, such as offices and first-aid rooms, may be used for the limited frequency screening audiometry. In addition, the test requires only a few seconds to administer, thus saving time and preventing fatigue and loss of attention in children. The instrument is inexpensive, lightweight, and durable, and trained personnel are not essential.

Description of Instrument Used for This Study

The measurements reported here were taken with a commercially available instrument called the Oto-chek (see figure). The Oto-chek is a simple, battery-powered, transistorized screening audiometer. There are two basic models of the Oto-chek, a single-frequency screener and a double-frequency screener. The first is designed to test hearing at 4,000 cps only, the other at 4,000 cps and at 2,000 cps. Either model may be obtained with a single earphone or with double earphones, according to the user's preference, and with output levels of 15 and 35 db. or of 20, 35, and 50 db. The frequencies and levels are fixed. The earphones are energized by means of push-buttons. Each button is labeled in decibels of hearing loss according to the level controlled by that particular button. When binaural earphones are used, only one earphone is energized at a time. The live earphone is selected by means of a two-position rotating switch. Research has indicated that a single earphone is adequate for most purposes. The only disadvantage is related to switching from one ear to the other. This is readily accomplished, however, by having the patient handhold the earphone. The entire circuit is housed in a metal box which measures 5.5 by 4 by 2 in. The Oto-chek is powered by a Mallory mercury cell battery. The earphones are of the dynamic type and are coupled to the ear by a standard MX41 AR type rubber cushion. The complete instrument weighs about 1.5 lb.

Summary

The limited frequency screening test provides a simple and accurate test for industry, military services, school testing programs, and the routine needs of the otolaryngologist, pediatrician, internist, and general practitioner. It is not necessary to make threshold audiograms to satisfy the needs of these programs or these physicians; it is sufficient to determine only whether a patient has normal hearing. Use of the proposed single and double frequency screening tests make it possible to determine, with a minimum of time, expense, and personnel, the presence or absence of impaired hearing.

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The Oto-chek used in this study is manufactured by the Ambco, Inc., Los Angeles.

VESICORECTOSTOMY

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In recent years many excellent techniques have been developed for urinary tract diversion after surgical excision or because of congenital absence or certain neurogenic disorders of the bladder. In certain patients the bladder itself is intact and able to perform its normal function, but the urine cannot leave the bladder through its normal urethral channel; this condition is found in patients with urethral strictures that recur despite multiple attempts at excision and reconstruction of the urethra. In 1954, Moore [1] reported a new technique of lower urinary tract diversion by the creation of a permanent fistula between the rectum and the bladder in the presence of an intact anal sphincter. This he referred to as "vesicorectostomy." On the basis of Moore's initial article, Robbins [2] reported several cases in which this procedure was utilized with a slightly modified operative technique. With this information, vesicorectostomy was performed on the patient whose case forms the basis for this report. In certain selected cases it is believed that this procedure is indicated, and this paper is presented for the purpose of further calling the attention of the profession to this procedure.

Operative Technique

Preoperatively, the patient receives an intestinal preparation consisting of liquid diet for 72 hours and 1 Gm. of neomycin sulfate hourly for four doses and then 1 Gm. every four hours for the 24 hours immediately preceding surgery. A Levin tube is passed prior to surgery. The patient is placed in a modified dorsal lithotomy position with the thighs moderately flexed and abducted. An assistant inserts an anoscope into the rectum for counterpressure against the anterior rectal wall. Through a midline suprapubic incision the bladder is exposed extraperitoneally, and it is entered through an ample vertical incision. A 3-cm. transverse incision is made in the floor of the bladder just proximal to the trigone, very carefully avoiding the ureters, which are kept under constant visualization. The incision is carried down through all the layers of the floor of the bladder, thus exposing the rectovesical space. With the anoscope in the rectum for counterpressure, the anterior rectal wall is grasped and incised transversely for a corresponding distance through all its layers. The incised rectal mucosa is grasped, and the full thickness of the rectal wall, including the mucosa, is sutured to the full thickness of the floor of the bladder, including the mucosa, with through-and-through interrupted stitches of 000 atraumatic chromic absorbable surgical suture. This suture affords hemostasis in addition to creating the fistula. The rectovesical fistula thus created is about 2 cm. in diameter (fig. 1). A 30 F. 5-cc. Foley catheter is inserted into the bladder suprapubically, and the bladder is closed with a continuous suture of 1 chromic absorbable surgical suture. A penrose drain is placed to the prevesical space, and the wound is closed in layers with interrupted sutures of 1 chromic absorbable surgical suture to the rectus fascia, interrupted sutures of 00 plain absorbable surgical suture to the subcutaneous tissues, and interrupted sutures of 0000 silk to the skin. A dry sterile dressing is applied. A large (36 F.) mushroom catheter is placed into the rectum and left indwelling, to be connected to straight drainage.

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Report of a Case

A 58-year-old male was admitted Dec. 17, 1956, with a periurethral abscess and multiple urethrocutaneous fistulas. The history began on Dec. 23, 1914, when, at the age of 16, he was initially seen in the genitourinary clinic of Roper Hospital with gonorrheal urethritis and chancroids, for which he was treated with copaiba (Lafayette's mixture) and methenamine (Urotropin) for 11 months.

The patient presented himself for treatment for the same condition in 1917 and in the summer of 1918. In October, 1918, he was noted to have a urethral stricture which was dilated to 16 F. with sounds. He was seen again in July, 1919, with acute urinary retention. During the next several months, he received urethral dilatations. The patient then was not seen until 1926, when he was again found to have urethral strictures. Blood serologic studies at this time revealed positive Wasserman and Kahn tests. He was treated for similar difficulties in 1934 and 1941, at which time a suprapubic cystostomy was performed for acute urinary retention due to impassable urethral stricture. Subsequently the urethra was dilated to 24 F. with sounds. Dilation was done in 1945 and 1949, and the patient was seen in October, 1950, with multiple urethrocutaneous fistulas and impassable urethral strictures, for which he refused surgery.

He was admitted in November, 1950, for incision and drainage of a periurethral abscess. At that time, he refused urethrotomy and was discharged in an extremely uncooperative state with the strictures still impassable to filiforms. When he was seen next in July, 1951, with a one-week history of periurethral abscess, his physical examination revealed urethral strictures and multiple urethrocutaneous fistulas. During this hospital stay, the urine was diverted with a cystostomy, and excision of the multiple urethrocutaneous fistulas, external urethrotomy, and urethral reconstruction were carried out. Patient was able to void with a good stream at the time of discharge and returned to the clinic irregularly for dilatations, only to return to the hospital in April, 1952, with a periurethral abscess and urethral stricture (which he claimed was secondary to a "straddle injury"). The abscess was drained and the stricture dilated, but following discharge the patient was not seen for five years.

In the fall of 1956, he was admitted to the surgical service for saphenous vein ligation but was transferred to the genitourinary service because of impassable urethral

strictures and multiple urethrocutaneous fistulas. During this admission the patient underwent excision of the urethrocutaneous fistulas, external urethrotomy, and, again, urethral reconstruction. At the time of discharge the patient was noted to be voiding with a good stream. The patient returned to the clinic for dilatations on two occasions and

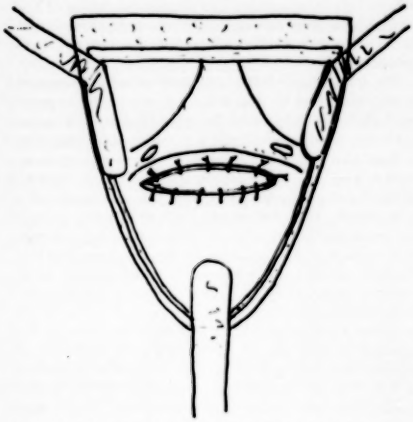

Fig. 1.—Diagram of appearance of floor of bladder after creation of vesicorectostomy.

then disappeared for six weeks, only to return with a filiform urethral stricture. This was progressively dilated up to 24 F. Several months later the patient was noted to have a recurrence of a fistulous tract in the left perianal area. This was incised in the clinic and treated with antibiotics and sitz baths. The fistulous tract continued to drain in spite of all attempts at therapy, and another tract soon appeared. The patient then came for his present admission.

Physical examination revealed a well-developed, well-nourished male in no apparent acute distress. He was noted to have the bilateral "saber shins" of congenital syphilis. The remainder of physical examination was essentially not remarkable, with the exception of the findings pertaining to the genitourinary tract. The right scrotum was enlarged three times normal size and was mildly tender. The mass transilluminated and apparently represented a hydrocele. There were multiple fistulous tracts in the perineum and in the right and left perianal areas, and small amounts of purulent material could be expressed from these. On rectal examination, the prostate was noted to be boggy, not tender, and enlarged 1+ to 2+. Urine culture revealed 70% Aerobacter aerogenes and 30% beta-hemolytic streptococci, both sensitive to nitrofurantoin (Furadantin). Intravenous pyelograms were essentially normal, with the exception of a large bladder calculus and multiple prostatic calculi (fig. 2). On Dec. 20, 1956, with the patient under general anesthesia, the bladder was opened, a shell-like bladder calculus was removed, and a vesicorectostomy was performed.

Postoperatively, the patient did well and urine drained through both the rectal and cystostomy catheters. He was maintained on a low-residue diet. On the fourth postoperative day the rectal tube was removed, and on the seventh postoperative day the sutures were removed from the wound. At this time the patient was noted to be leaking urine through the urethra, but this ceased after several days. On Jan. 3, 1957, the multiple urethrocutaneous fistulas were excised. It was noted that each fistulous tract arose from a large cavernous space, filled with purulent material, in the approximate region of the bulbous urethra. There was no identifiable urethra in the area of the bulb. At the termination of the dissection there was a large cavernous space lined with scar tissue and no normal tissue in the area with which to attempt to reconstruct the urethra or close it off. Accordingly, the space was packed with iodoform gauze and the wound was closed over the latter. The pack was removed on the fifth postoperative day, and the patient was given sitz baths in addition to antibiotics. The patient was afebrile with the exception of a temperature spike to 103 F (39.4 C) on the 10th day, which responded immediately to a change of antibiotic. The perineal sinus tract, at the site of the gauze pack, continued to drain slightly but appeared to be granulating inward slowly. The patient was discharged on Jan. 27, 1957, to be followed up in the clinic. The cystostomy tube was draining clear urine. The patient was voiding urine per rectum, and there was slight drainage of purulent material from the perineal sinus tract.

Several weeks later in the genitourinary clinic, the cystostomy tube was clamped as a trial, and the patient voided per rectum every two hours without difficulty.

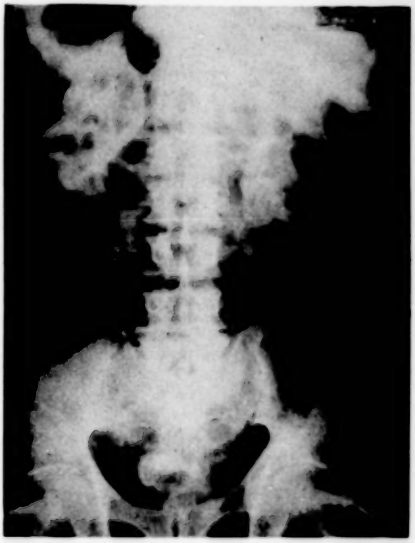

Fig. 2.—Preoperative pyelogram revealing normal upper tract and bladder calculus.

There was no urinary drainage per urethra. The cystostomy tube was removed, and the suprapubic sinus healed over rapidly. In the six months following the vesicorectostomy, the perineal fistulous tract continued to drain purulent material in variable amounts. Recently, the tract has been receiving irrigations of 5% solution of strong silver protein (Protargol), with considerable reduction in the quantity of the drainage. Should the tract continue to drain, a second attempt at excision will have to be made.

On June 12, 1957, intravenous pyelograms revealed prompt excretion and good concentration of the contrast medium in five minutes from both kidneys. The calyces were well cupped, and the renal pelvis and ureters appeared normal bilaterally. The contrast medium was noted to be draining from the bladder into the rectum (fig. 3). The

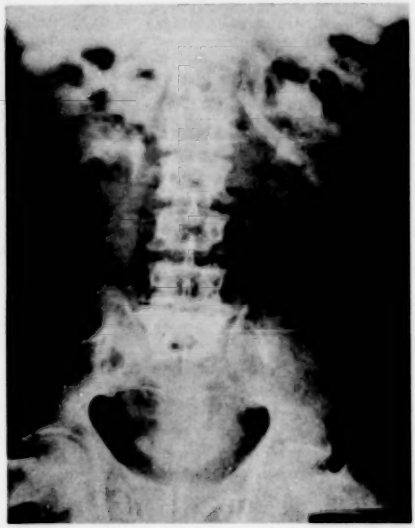

Fig. 3.—Pyelogram taken six months postoperatively revealing normal upper tracts and showing contrast medium escaping from bladder to rectum as a result of vesicorectostomy.

blood urea nitrogen level at this time was 17 mg. per 100 cc. The patient is fully ambulatory at the time of writing and, with the exception of the annoyance of the drainage from the perineal sinus tract, is quite satisfied with the results of the vesicorectostomy.

Comment

The above-described operative technique may perhaps be modified slightly in the future in the light of Robbins' article [2] (which was published about one month after the operation). It is felt that the suprapubic catheter drainage after surgery affords an additional measure of safety without any additional morbidity. Its use may, however, be modified in the future. In the case reported here, it was probably maintained longer than was necessary. Others [3] have recommended digital dilatation of the vesicorectostomy through the rectum. In this patient the high position of the floor of the bladder prevented this.

The indications for this procedure would seem to be any situation in which an intact bladder is present but there is a need for the diversion of urine from this bladder through a channel other than the urethra. An intact anal sphincter is, of course, necessary. The possible complication of severe cystitis has not been encountered, nor has pyelonephritis been noted. The patient has been instructed to void per rectum every two hours, and, with a large fistula on the floor of the bladder, it would seem that the bladder should not become overdistended with possible ureteral reflux. The "sphincter-like" action of the normal ureterovesical junction probably helps to prevent regurgitation of intestinal contents to the kidneys. In this regard, perhaps a preoperative cystogram and delayed cystogram would be indicated to rule out the possibility of ureteral reflux, which would contraindicate the procedure. Poor renal function, acute and chronic pyelonephritis, and such other renal abnormalities as hydronephrosis and calculus would also contraindicate vesicorectostomy.

Summary

The technique of creation of a permanent vesicorectal fistula, or vesicorectostomy, has been found useful in the treatment of patients with impassable urethral strictures. Vesicorectostomy was successfully carried out in a 58-year-old man with a periurethral abscess and multiple urethrocutaneous fistulas. Neither cystitis nor pyelonephritis occurred.

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3. References 1 and 2.

FREEDOM TO THINK.—There is a more important freedom than any of those mentioned in Mr. Roosevelt's famous four. It is the freedom to think. What good is freedom of speech without freedom to think? In this, science is the freest way of life I know of. It is free to think. It can entertain new ideas and concepts as no other way of life can. The politician must ask what the effect of a new concept will be on his party and on his political fortunes. The chauvinist must ask what the effect will be on his nation or race. The sectarian must ask whether the concept is truly orthodox, whether it falls within the tenets of his sect. The scientist asks only if it is true or if it shows promise as a working hypothesis.—R. S. Gill, Scientific Freedom, *Journal of Forensic Sciences*, January, 1958.

FURTHER OBSERVATIONS ON CYSTINOSIS IN THE ADULT

David G. Cogan, M.D., Toichiro Kuwabara, M.D., Cornelius S. Hurlbut Jr., Ph.D.
and
Virginia McMurray, Ph.D., Boston

In a recent publication,[1] several of us reported a patient with cystine crystals in the conjunctiva and cornea, a sign which is thought to be pathognomonic of systemic cystinosis. The chief interest in this case revolved around the fact that the patient was a healthy adult of normal physique, whereas the cystinosis of infancy results in renal rickets and usually death within the first one or two decades of life. Furthermore, our patient showed neither amino acid disturbance in the blood nor renal disturbance, which is characteristic of infantile cystinosis. In our previous article, the term Lignac-Fanconi syndrome was used synonymously with the term cystinosis. This was in keeping with the terminology employed by Bickel and coworkers.[2] Since then, our attention has been called to an article by DeToni,[3] in which he proposes the name Abderhalden-Kaufman-Lignac syndrome for this entity as being historically more accurate.

Since the publication of our preliminary report and, in part, on account of it, several aspects have come to light which warrant a further note. In the first place, our case was unique in that it was the only verified instance of cystinosis in an adult. We were, however, able to find and cite a case reported by Burki and Rohner [4] which was thought at the time to be cystinosis in an adult, but the conjunctival biopsy and sternal marrow were negative. Correspondence with Burki [5] has now indicated that this patient subsequently died of multiple myelomatosis. A small piece of cornea removed at autopsy showed deposits of paraprotein, such as has been found in other cases of multiple myeloma,[6] and it is now concluded that this was not a case of cystinosis. (Myelomatosis was ruled out in our patient by his age, 23 years, by his normal electrophoretic pattern of blood proteins, and by the repeatedly normal urinalyses.)

Secondly, we recontacted our patient and persuaded him, on the basis of the uniqueness of his case, to permit a sternal puncture, another conjunctival biopsy [7] (this time for study by x-ray diffraction), and a skin biopsy. Smears of the sternal puncture showed a considerable number of crystals (fig. 1). These were vividly birefringent and mostly rod-shaped and tended to have a relatively uniform breadth of 2 to 3 μ with a variable length up to 10 μ. The variable length may have been due to fragmentation. The crystals were seen in fresh smears, smears fixed in 90% alcohol solution, or smears fixed in methyl alcohol and stained with Wright's solution. Staining by the von Kossa or Giemsa technique resulted in some distortion of the crystals. The crystals were extracellular and appeared to have given rise to no reaction. No such crystals were seen in control smears removed from patients with various other disease entities.

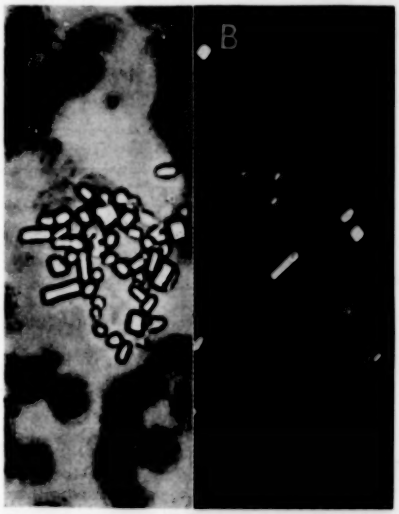

Fig. 1.—*A*, unretouched photograph of bone marrow smear showing cluster of crystals among red blood cells. Smear was fixed in alcohol and mounted in Permount (Fisher) but not stained. Photograph was taken with oil immersion. *B*, photograph of bone marrow smear taken with crossed polaroids showing scattered birefringent crystals.

The clot obtained by sternal puncture was fixed in alcohol, dehydrated, and embedded in paraffin. It showed the same type of crystals as had been seen in the smear.

The conjunctival specimen, removed from the eye opposite that previously biopsied, was fixed in 95% alcohol solution and prepared en bloc for

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study by x-ray diffraction. This specimen was further dehydrated in 100% alcohol and then passed through ether. It was blotted dry, fixed to a glass slide with collodion, and subjected to x-ray diffraction with use of a Norelco diffractometer. Subsequently, the specimen was prepared for crystallographic examination according to the x-ray powder diffraction technique. Similar diffractometric and powder techniques were employed with use of known samples of L-cystine (C. P.) and a piece of conjunctiva removed from a patient without evidence of cystinosis.

Fig. 2.—Diffractometric graph of *A*, normal conjunctiva; *B*, known L-cystine crystals; and *C*, conjunctival biopsy of patient. While varying in magnitude, peaks of test specimen (*C*) coincide with those of L-cystine (*B*). Normal conjunctiva, on the other hand, shows no significant peaks.

In the diffractometer graph of the test sample the same strong peaks appeared as in the control graph (fig. 2), which is interpreted as unequivocal evidence for the identity of the crystals as cystine. The powder technique also gave a similar "signature" for the test and control samples, but owing to the small number of crystals the photograph is not as striking for the test sample as for the control. The control sample of normal conjunctiva gave no indication of cystine crystals.

The skin specimen, removed from the axilla, was sectioned in the fresh-frozen state and after fixation in 90% alcohol. No crystals were seen. The possibility that crystals in the skin would have been dissolved out by the procainamide (Novocain) infiltration seems unlikely since the conjunctival tissue was similarly obtained after procainamide infiltration.

Comment

Further study of the case of adult cystinosis has shown that the characteristic crystals were also found in the sternal marrow but not in the skin. Adding to the previous evidence of chromatography and solubility, further identification of the crystals has been obtained through x-ray diffractometry. There would appear to be little or no doubt, therefore, that the crystals were cystine.

Through the kind offer of Dr. C. E. Dent, who has been one of the outstanding investigators of infantile cystinosis,[7] we obtained further data on the urine of our patient. The urinary amino acid chromatogram done by Dr. Dent was normal. There was no aminoaciduria, and the pattern, which mainly was composed of glycine, taurine, and histidine, was also well within the normal range.

Summary and Conclusions

Further information on the case of adult cystinosis previously reported has indicated that (1) the characteristic crystals were also present in the sternal marrow, although not in the skin; (2) the conjunctival crystals were shown to be cystine by x-ray diffractometry; and (3) this is the first verified case of adult cystinosis to have been reported.

The significance of our case, aside from its uniqueness, is the recognition of an adult form of cystinosis. Contrary to the fatal prognosis of the infantile form, cystinosis in the adult is compatible with a normal physique and general good health.

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COUNCIL ON DRUGS

Report to the Council

The Council has authorized publication of the following report. Nonproprietary terminology is used for all drugs that are mentioned; when such terminology is not considered to be generally well known, its initial appearance is supplemented by parenthetic insertion of names known to be applied to commercial preparations.

H. D. KAUTZ, M.D., *Secretary.*

CURRENT STATUS OF THERAPY IN PEPTIC ULCER

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Introduction

Peptic ulcer is one of the important medical problems of our time. Its incidence in the general population is not known precisely but in the United States probably approximates 10% on a lifetime basis. The annual mortality has been estimated in excess of 10,000 persons.

Peptic ulcer is the product of an abnormal physiology characterized by inability of localized areas of the stomach and duodenum to withstand the digestive action of acid gastric juice. In gastric ulcer, the output of hydrochloric acid is normal or low, but its corrosive effect presumably surpasses the diminished resistance of the gastric mucosa. In duodenal ulcer, the secretion of hydrochloric acid is excessive, two to four times greater than normal, and its digestive capacity exceeds the apparently normal resistance of the duodenal mucosa; however, localized areas of vulnerability also may exist in the duodenum, as in the stomach. The hypersecretion in duodenal ulcer is demonstrable for 1 or 24 hours, between meals, during the night, and after the ulcer has healed. Its mechanism is not established completely. Anatomically, it seems to be correlated with an increased number of parietal cells in the fundus and body of the stomach. Physiologically, histamine, acetylcholine, hormonal factors, including gastrin from the antrum, and adrenocortical hyperfunction have received consideration. Present evidence tends to emphasize the role of vagal hyperactivity, acting upon a more responsive gastric secretory mechanism; however, other factors, chemical and humoral, undoubtedly are involved. Peptic ulcer occurs only among individuals capable of secreting acid and only in those areas of the digestive tract exposed to hydrochloric acid, namely, the lower portion of the esophagus, the stomach, the first portion of the duodenum, the jejunum in a patent gastroenterostomy, and in a Meckel's diverticulum containing acid-secreting gastric mucosa. Most techniques for producing ulcers experimentally involve the overproduction of hydrochloric acid or interference with the usual mechanisms for neutralizing and buffering the acid. The role of hydrochloric acid in the pathogenesis of peptic ulcer thus may be compared to that of the essential catalyst in a chemical reaction; other ingredients (etiological factors) are involved in the process, but, in the absence of the hydrochloric acid, the reaction cannot proceed.

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Tissue Resistance

A priori, tissue vulnerability, localized or diffuse, should be a significant factor in the development of peptic ulcer. However, little is known of the nature of tissue resistance. Alterations in the rate of regeneration of epithelial cells, in the mucous barrier and in the vascular supply to the stomach and duodenum, may be important; other mechanisms probably are involved, but their identity is not known.

In the absence of a specific cause, the treatment of peptic ulcer emphasizes protection of the gastroduodenal mucosa from the digestive action of hydrochloric acid. This objective probably would be accomplished by increasing tissue resistance. However, there is no established procedure for improving the defenses of the stomach and the duodenum directly. The animal tissue extracts, hormonal substances, extracts of pregnant mares' urine, cabbage juice, chlorophyll, and other materials of uncertain composition suggested for this purpose are of no value. The resistance of the stomach and the duodenum probably is enhanced indirectly by improving the general health of the patient, by eliminating gastric irritants in food, drink, and medication (alcohol, salicylates), and by avoiding excessive physical and emotional stress.

Therapeutic Objectives

The complete elimination of hydrochloric acid would abolish peptic ulcer, regardless of tissue susceptibility and other possible etiological factors. However, no method, pharmacological, medical, or surgical, except total gastrectomy, consistently produces complete and permanent anacidity; hence,

no procedure per se regularly cures the disease. Therapy emphasizes the effective neutralization or inhibition of hydrochloric acid and concurrent elimination of peptic activity. The clinical objectives are relief of pain, complete healing of the ulcer, and prevention of complications and recurrences. Because of the natural tendency to healing and recurrence, accurate evaluation of treatment in peptic ulcer requires prolonged and well-controlled observation for at least two years and preferably longer.

Therapeutic Management

Diet.—There is no satisfactory evidence relating the usual peptic ulcer to abnormal protein metabolism or to a dietetic deficiency requiring special nutritional supplements. Thus, there appears to be no scientific basis in man for the use of preparations such as a mixture of extracts of cattle liver, brains, and adrenals, together with dehydrated milk and cream, choline hydrochloride, vitamins, and minerals (Exul). The protein-vitamin-mineral supplement (Sustagen) and similar preparations, administered as a drink or intragastric drip, provide additional calories and may buffer hydrochloric acid; however, they are not necessary when the intake and digestion of food are normal. The ulcer patient is capable of eating a more liberal diet than has been advocated in the past. Restriction of food does not necessarily cure peptic ulcer. On the other hand, disregard of dietary considerations neglects a useful means of relieving distress, for certain foods may irritate the gastroduodenal mucosa and contribute to ulcer pain.

The dietary management of peptic ulcer emphasizes frequent feedings of bland foods, avoids mechanical, chemical, or thermal irritants, provides adequate amounts of proteins, carbohydrates, calories, minerals, and vitamins, and assists in the neutralizing and buffering of the gastric contents. The diet includes whole milk and 22% cream, or half and half (12% cream), taken as an equal mixture in quantities of 90 to 120 cc. (3 or 4 oz.) hourly from 7 a. m. to 7 p. m. Chocolate, malt, and protein supplements may be added if a gain in weight is desired. Skimmed milk may be substituted if the patient is obese. In the absence of gastric retention, additional food is administered in the form of six feedings daily. The feedings initially are selected from the following items: cooked cereals, soft boiled eggs, toast, butter, strained cream soups, custards, puddings, plain cookies, jello, and ice cream. After 7 to 10 days of complete relief from ulcer distress, or sooner in the absence of obstruction, the feedings are replaced by a three-meal diet consisting of a substantial breakfast and noon meal and a moderate supper; a small feeding later in the evening also is permissible. The meals are selected from the following list:

Cereals
- Cream of wheat
- Farina
- Refined rice
- Rice krispies
- Puffed rice
- Rice flakes
- Macaroni
- Noodles
- Spaghetti
- Vermicelli
- Corn flakes
- Oatmeal

Eggs
- Soft boiled
- Soft scrambled
- Soft omelet
- Poached
- Soft baked
- Hard cooked

Cheese
- Cream
- American
- Swiss
- Cottage

Milk, Milk Products
- Buttermilk
- Milk
- Cocoa
- Ovaltine
- Eggnog
- Butter

Beverages (1 cup)
- Tea
- Sanka or Kaffe Hag
- Coffee
- Postum

Potatoes
- Baked Irish
- Mashed Irish
- Au gratin
- Escalloped
- Boiled

Cooked or Canned Fruits
- Prunes
- Peaches
- Applesauce
- Plums
- Apricots
- Pears
- Baked apples (no skin)
- Pineapple

Raw Fruits
- Bananas
- Oranges (juice, sections, whole)
- Grapefruit

Cooked or Canned Vegetables
- Asparagus
- String beans
- Carrots
- Spinach
- Sweet potatoes
- Peas
- Tomatoes

Breads
- White
- Toast
- Melba toast
- Toasted crackers
- Croutons
- Bread sticks
- Milk toast
- Biscuits of white flour
- Plain rolls
- Zwieback
- Soda

Soups
- Consommé
- Chicken broth
- Vegetable
- Rice, creamed
- Potato, creamed
- Celery, creamed
- Tomato, creamed
- Asparagus, creamed
- Mushroom, creamed

Fish
- Salmon, creamed
- Tunafish, creamed
- Whitefish, creamed
- Whitefish, baked
- Cod
- Haddock
- Mackerel
- Halibut
- Flounder

Meats
- Crisp bacon
- Chicken
- Turkey
- Beef
- Lamb
- Meat loaf
- Steak
- Veal
- Hamburger

Desserts
- Vanilla custard
- Caramel custard
- Floating island
- Rice custard
- Bread pudding
- Tapioca pudding
- Cornstarch pudding
- Plain jello
- Cottage pudding
- Angel food cake
- Ice-box cake
- Plain cake
- Lady fingers
- Sponge cake
- Arrowroot cookies
- Ice cream, plain

Miscellaneous
- Jelly
- Marmalade

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All foods should be well cooked and chewed thoroughly. One cup of coffee in the morning and one or two cups of tea during the day may be permitted. The following foods should be avoided: seasonings, spices, meat extractives, alcoholic and carbonated drinks, cabbage, turnips, corn, nuts, sausage, pork and pork products (except bacon), and fried, very hot, or very cold foods. The intake of milk and cream is decreased gradually from hourly intervals to two-hour intervals and ultimately to between meals. The bland three-meal diet is continued indefinitely, with further additions as indicated by the progress of the patient. The casual suggestion to "watch your diet" or "avoid irritating foods" is vague and ineffectual. The program should be outlined clearly, preferably in a printed list of those foods to be eaten and those to be avoided.

Antacids.—The purpose of antacid therapy is constant neutralization of the acid gastric content. The ideal antacid theoretically should possess these advantages: prolonged, effective neutralization when administered orally in acceptable amounts, absence of subsequent stimulation of secretion, no untoward systemic effects such as alkalosis, no cathartic or constipating action, no interference with digestive or absorptive processes, palatability, and low cost. These qualities each are desirable, but they are not of equal importance. Serious toxic effects would obviate the usefulness of an otherwise potent antacid. The absence of constipation or diarrhea is of secondary clinical value when there is little or no neutralizing action. Effective neutralization is maintenance of the pH of the gastric content between 4.0 and 5.0, or higher; at this hydrogen ion concentration, acid and peptic activity are practically absent. On the other hand, peptic ulcer probably heals with less complete control of gastric acidity.

The ideal antacid thus far has not been developed. Neutralizing efficiency in patients with duodenal ulcer is limited by the excessive rate of gastric secretion and by the rate of gastric emptying. On the other hand, antacids neutralize hydrochloric acid at least partially, relieving pain and facilitating healing. Many preparations are available. The most potent compound probably is calcium carbonate, administered in quantities of 2 to 4 Gm. hourly during the day and evening (7 a. m. to 9 p. m.). The principal disadvantage of calcium carbonate therapy is constipation, especially in older patients; this usually can be corrected by substitution of the more laxative magnesium carbonate in amounts required by the individual patient. Careful attention to bowel function is necessary with all types of antacid therapy.

Therapy with milk and calcium carbonate may be complicated infrequently by the hypercalcemic syndrome. This disorder is characterized clinically by weakness, headache, distaste for milk and food, and by nausea and vomiting. The chemical features are elevation of the serum calcium and blood urea nitrogen levels and temporarily depressed renal function. This complication is more likely to occur in older patients with hypertension and preexisting impairment of renal function, or in those in whom renal physiology is disturbed by gastrointestinal hemorrhage or electrolyte and fluid depletion. It has been observed also in patients taking milk and cream and sodium bicarbonate only. The syndrome subsides rapidly after discontinuance of milk and alkali and the intravenous administration of isotonic sodium chloride solution or dextrose and water for injection.

Combinations of calcium carbonate with glycine or calcium caseinate do not appear to offer special neutralizing advantages. Magnesium carbonate and magnesium oxide are potent antacids; because of their laxative effect, they are prescribed chiefly to counteract the constipating action of the ulcer regimen. Tribasic calcium phosphate, tribasic magnesium phosphate, magnesium trisilicate, magnesium hydroxide, magnesium tartrate, calcium tartrate, and dihydroxyaluminum sodium carbonate, in doses of 2 to 4 Gm. hourly, neutralize gastric acidity in varying degrees. Aluminum hydroxide (Alkagel, Al-U-Creme, Aluminum Hydroxide, Amphojel, Creamalin), aluminum phosphate (Phosphaljel), and basic aluminum carbonate (Basaljel), taken alone in liquid or gel form in doses of 8 to 16 cc., and in various mixtures, partially neutralize gastric acidity. Their capacity to inactivate pepsin in vivo seems no greater than that of calcium carbonate; the astringent, demulcent, and coating properties attributed to them are not susceptible to scientific measurement in man. Aluminum hydroxide increases the excretion of phosphate in the feces; however, the serum electrolytes are not altered. The constipating effect of aluminum hydroxide may be counteracted with administration of magnesium trisilicate or magnesium hydroxide. Hydrated sodium aluminum silicate, "nonreactive" aluminum hydroxide, and dihydroxyaluminum aminoacetate (Alglyn, Alzinox, Aspogen, Dimothyn, Doraxamin, Robalate) do not appear to offer any special advantages.

Anion exchange resins, such as polyaminemethylene resin (Exorbin, Resinat), are large insoluble bases with the capacity to absorb the anion of an acid, forming an insoluble resin salt. In alkaline intestinal contents the anion exchange is reversed, and the resin is restored to its original state. Various resins, alone or in combination with antacids, are available; they may lower gastric acidity partially in man. Bismuth salts and hog gastric mucin have no neutralizing value. Sodium carboxymethylcellulose (Carmethose, CMC Cellulose Gum, Sodium Carboxymethylcellulose, Thylose Sodium), alone or in combination, does not offer any special advantages. Protein hydrolysates (Aminonat, Caminoids) given orally may decrease acidity temporarily, but not impressively. The antacid effect of sodium bicarbonate is pronounced but transient; it is not prescribed because of the

possibility of alkalosis when taken in large quantities, especially in patients with impaired renal function.

In addition to powders and liquids or gels, some antacids are available also as tablets; these preparations contain aluminum hydroxide, magnesium trisilicate, calcium carbonate, magnesium oxide, or magnesium carbonate, alone, in various quantities and mixtures, or combined with resins, milk proteins, and vitamins. Antacid tablets are inferior to powdered or liquid preparations because of the smaller amounts entering into the reaction with hydrochloric acid; however, rapidly disintegrating tablets may obviate this difficulty. Their principal usefulness is as adjunct antacid medication taken away from home or at work, and their effectiveness is dependent upon adequate dosage. A compressed tablet containing milk solids with 220 mg. of magnesium trisilicate, 120 mg. of magnesium oxide, 120 mg. of calcium carbonate, and 30 mg. of magnesium carbonate (Nulacin) also is available. The tablet is kept between gum and cheek and is allowed to dissolve gradually by continuous sucking; 10 to 16 tablets thus may be taken daily. This medicament may neutralize acid more effectively than do standard tablets, but the amounts of antacid are very small. The continuous retention of a large tablet in the mouth may become a tedious ritual, acceptable only to occasional patients.

Antacids act locally upon the gastric contents; since they do not influence the acid-secreting cells, their neutralizing effect is temporary and disappears when the medicament is discontinued. Since the healing time of peptic ulcer may be prolonged and since ulcers often recur, antacid therapy must be prolonged. The hourly schedule is continued until the ulcer has healed completely. The antacid then is prescribed at intervals of two and three hours, and, subsequently, once or twice between meals and during the evening; many patients maintain this latter program indefinitely. The administration of small quantities of mild antacids immediately after meals, a not uncommon practice, is impractical and ineffective, since the food alone may neutralize acid during this period, and the intervals between medication are too long. If antacids are to be prescribed only occasionally, they are more useful several hours after meals when the buffering effect of food has been dissipated.

Gastric acidity also may be neutralized by the continuous administration of milk and cream and alkali, administered through an intragastric tube. One liter of milk containing 5 Gm. of sodium bicarbonate may be administered every eight hours. Another solution is prepared by mixing 100 cc. of aluminum hydroxide or aluminum phosphate gel with 300 or 400 cc. of warm tap water; it is administered at a rate of 15 to 20 drops per minute; 1,500 to 3,000 cc. of the diluted suspension may be given in 24 hours. Food supplements may be given similarly as an additional source of calories for the nutritionally depleted patient. For example, one pound of the previously mentioned protein-vitamin-mineral supplement in one-quart solution provides 300 Gm. of carbohydrate, 150 Gm. of protein, 15 Gm. of fat, and 1,750 calories. It is administered at the rate of 80 to 100 drops per minute. The intragastric drip may be maintained for the 12-hour night period or continuously for as long as 7 to 10 days. The procedure has been recommended in patients with gastric hypersecretion and severe ulcer pain not controlled by ordinary measures, and occasionally in the treatment of massive hemorrhage; it is contraindicated in the presence of pyloric obstruction.

Gastric Antisecretory Compounds.—Diet and antacids do not control gastric acidity in peptic ulcer completely or continuously. Furthermore, many patients are reluctant to continue such a meticulous program indefinitely. Interest in anticholinergic medication is based upon the theoretical possibility of prolonged suppression of acid secretion, permitting a more liberal program. Anticholinergic drugs interfere with the transmission of nerve impulses mediated by acetylcholine at the neuroeffector junctions of postganglionic cholinergic nerves. Their use in peptic ulcer is based upon the concept that parasympathetic (vagal) hyperactivity is chiefly responsible for the gastric hypersecretion of duodenal ulcer and the expectation that these compounds will suppress the neurogenic mechanism. Actually, other phases of gastric secretion also may be influenced by these agents. Most anticholinergic drugs also inhibit gastrointestinal motility and diminish muscle spasm. However, this effect, although it may contribute to the relief of abdominal pain, is not essential to the healing of peptic ulcer.

Average doses of tincture or powdered extract of belladonna do not inhibit acid secretion significantly in patients with peptic ulcer. Atropine sulfate, 0.5 mg. given three or four times daily by mouth, is partially effective; the same dosage given intramuscularly reduces the volume of secretion and the output of acid occasionally. Systemic manifestations of parasympathetic inhibition are frequent with dosages sufficient to inhibit gastric secretion in man. The chief usefulness of atropine and similar compounds in ulcer therapy may be to delay gastric emptying, permitting a longer period of interaction between acid and antacid. Synthetic atropine substitutes, including amprotropine (Syntropan) phosphate, homatropine methylbromide (Malcotran, Mesopin, Novatrin), adiphenine hydrochloride (Trasentin), dibutoline (Dibuline) sulfate, and dicyclomine (Bentyl) hydrochloride, are less effective than atropine. The quaternary ammonium compounds, tetraethylammonium (Etamon) chloride or tetraethylammonium bromide, administered parenterally, and hexamethonium (Bistrium, Esomid, Hexameton, Hiohex, Methium) salts, prescribed orally, may inhibit acid temporarily. However, these drugs cause disturbing

side-effects, including postural hypotension and intestinal atony, and are not intended for use in ulcer therapy.

Methantheline (Banthine) bromide temporarily suppresses gastric acidity when injected intramuscularly in doses exceeding 0.03 mg. per kilogram of body weight. The antisecretory effect after oral administration is less impressive. Single oral doses of 50 or 100 mg. of methantheline bromide may lower the volume of secretion; however, the concentration of hydrochloric acid remains unchanged. Dosages of 50 or 100 mg. given orally four times daily may provide symptomatic relief, but side-effects are common. Peptic ulcer may recur during the use of methantheline bromide; patients occasionally appear to develop a tolerance to the medication. The antisecretory effect of diphemanil (Prantal) methylsulfate resembles that of methantheline bromide. However, side-effects are less frequent, and 400 to 800 mg. or more may be taken by mouth daily without apparent discomfort.

Many new gastric antisecretory compounds have been developed. Some of these include the following agents.

Drug	Suggested Daily Dose for Adults, Mg.
Benzomethamine (Cotranul) chloride	400
Clidinium (Marplan) bromide	20-25
Hexocyclium (Tral) methylsulfate	75-100
Homatropine (Malcotran, Mesopin, Novatrin) methylbromide	100-200
Methscopolamine (Lescopine, Pamine) bromide	15-30
Methscopolamine (Skopolate) nitrate	6-12
Oxyphenonium (Antrenyl) bromide	40
Penthienate (Monodral) bromide	15-30
Pipenzolate (Piptal) methylbromide	25
Piperphenamine (Darstine) bromide	400
Propantheline (Pro-Banthine) bromide	75-240
Tricyclamol (Elorine, Tricoloid) methylsulfate	200-400
Tridihexethyl (Pathilon) iodide	200

Anticholinergic compounds are much more potent when administered intramuscularly than orally, but parenteral therapy, except in occasional hospitalized patients, is not practical. Since they are more effective against basal-stimulated secretion than against food-stimulated secretion, the medication is taken before meals. Increased amounts, two or three times larger than average, are prescribed at bedtime in an effort to lower the excessive nocturnal gastric secretion. Since the action of these drugs is limited to the period of administration, they must be taken continuously. The objective in peptic ulcer is prolonged inhibition of gastric secretion; therefore, treatment is maintained for long periods of time. The important considerations in anticholinergic therapy are the use of sufficient quantities and sustained regular use of the medicament.

No single anticholinergic compound excels in gastric inhibitory capacity, clinical tolerance, and therapeutic value, although several appear to be more effective than the majority; these include methscopolamine, propantheline, penthienate, homatropine, hexocyclium, and several additional compounds now under study. In general, the drugs that lower acidity most effectively also tend to produce systemic manifestations of parasympathetic inhibition. The symptoms include dryness of the mouth, blurring of vision, constipation, slowing of the urinary stream, headache, drowsiness, heartburn, tachycardia, choking sensation, and mental confusion.

The ideal gastric antisecretory agent, suppressing acidity for long periods of time after oral administration, without development of tolerance and with minimal or no side-effects, thus remains to be synthesized. Present compounds do not produce a true "medical vagotomy." However, they are superior to belladonna, atropine, methantheline, and diphemanil. Several preparations, administered orally, may decrease acid secretion, at least temporarily. As adjuncts to antacids, they probably facilitate more efficient neutralization of the gastric contents; and, in occasional patients at least, they may benefit not only the immediate course but also the long-term course of peptic ulcer. On the other hand, their value in preventing the complications of peptic ulcer and in decreasing the need for surgery has not been established. The use of anticholinergic drugs alone in the management of peptic ulcer is not recommended. These compounds are contraindicated in the presence of pyloric obstruction, incipient glaucoma, prostatic hypertrophy, and cardiospasm. The continued synthesis of new preparations indicates that the chemical possibilities in this field have not been exhausted.

Ineffective Compounds.—The available antihistaminic compounds do not lower gastric acidity significantly in man and are of no value in the treatment of peptic ulcer. Endocrine preparations, including parathyroid extract, posterior pituitary extract, enterogastrone, urogastrone, sex hormones, and desoxycorticosterone acetate (Cortate, Decortin, Decosterone, Doca Acetate, Percorten), do not reduce gastric acidity significantly in patients with duodenal ulcer. Compounds inhibiting the enzyme carbonic anhydrase may lower the output of hydrochloric acid after intravenous administration. However, large quantities of carbonic anhydrase inhibitors, such as acetazolamide (Diamox) given orally, do not suppress gastric secretion significantly or continuously in patients with duodenal ulcer.

In the absence of a specific cure, the number of alleged ulcer remedies remains enormous. Many have been discredited. Current evidence indicates that the following substances also should be discarded for this purpose: detergents such as sodium alkyl sulfate, urea-formaldehyde resins, thixotropic gels, bile salts, histidine, extracts of pregnant mares'

urine, extracts of animal stomach, duodenum, and colon, chlorophyll, and cabbage juice. Surface-coating agents that theoretically protect the ulcer from hydrochloric acid, such as emulsified dimethylpolysiloxanes, have not been developed for clinical use.

Gastric Aspiration.—Nightly aspiration of the stomach with an Ewald or Levin tube is useful in hospitalized patients with gastric retention, since it removes a considerable quantity of acid content, otherwise bathing the ulcer and contributing to its activity. Gastric aspiration also is an effective method of relieving severe ulcer distress, and it may provide important information regarding the management of patients with retention. A decrease in the nightly aspiration to a volume of 90 to 120 cc. suggests that inflammation, edema, and spasm may be causing the obstruction, rather than cicatricial stenosis. Persistently large aspirates, on the other hand, indicate organic obstruction, necessitating surgical treatment.

Roentgen Irradiation of the Stomach.—Mild roentgen irradiation of the stomach may be utilized as adjunct therapy for the purpose of decreasing or suppressing completely the secretion of hydrochloric acid. Approximately 1,600 to 2,000 r, total depth dose, is directed in 10 divided applications to the fundus and body of the stomach, over fluoroscopically outlined anterior and posterior portals. The inhibitory effect of irradiation upon gastric secretion depends upon the destruction of parietal cells. The development of anacidity is followed invariably by complete healing of the ulcer and by no recurrence for the duration of the anacidity. Although the degree of secretory inhibition is quite variable, the clinical course often seems distinctly benefited. Harmful effects have not been observed. Gastric irradiation also has been combined with the surgical procedure of antroduodenectomy. Approximately two months after operation, a depth dose of 2,000 r is delivered in divided amounts during a period of three weeks. Roentgen irradiation of the stomach, despite favorable reports, thus far has not been widely used as a therapeutic adjunct in peptic ulcer. The procedure is not employed in children or young men and women. Its primary indication is for recurrent peptic ulcer not consistently controlled by adequate medical management in individuals above the age of 45 years.

Special Problems

Physical and Emotional Stress.—The admonition to treat the patient as well as his ulcer is not a trite remark. Excessive physical fatigue and prolonged emotional stress may increase the secretion of hydrochloric acid and the susceptibility of the gastroduodenal mucosa to injury. Rest and relief of emotional tension, consequently, are important adjuncts in therapy. The needs vary with the individual; some patients can adjust their daily routine to obtain more rest without discontinuing their work; others respond more effectively to a vacation away from home. Hospitalization for several weeks is desirable in patients with persistent severe ulcer distress and especially in the management of recurrent or complicated ulcers. Hospitalization provides an opportunity for careful regulation of therapy and more thorough indoctrination of the principles of treatment; it also removes the patient, at least temporarily, from the stress-producing environment.

Management of the emotional problems requires identification of the disturbing factors, domestic, social, or environmental, and intelligent efforts at their control by avoidance, "ventilation" of the problem, reorientation of the patient, or release of tension in pleasant recreational activities. The ultimate goals are the establishment of regular habits and a life of moderation. The support provided by the interested, friendly, yet objective physician may be helpful in this regard. Formal psychotherapy usually is unnecessary. Mild sedation with 30 mg. of phenobarbital given four times daily promotes relaxation and rest; sedatives at night are useful in ensuring an adequate amount of sleep. "Tranquilizing" drugs also are prescribed for this purpose, alone or combined with anticholinergic medication. They are useful in occasional patients but do not appear to have any special advantages in ulcer therapy. Chlorpromazine (Thorazine) hydrochloride given in large amounts may decrease gastric secretion; on the other hand, large doses of reserpine (Rauloydin, Raurine, Reserpine, Reserpoid, Roxinoid, Sandril, Serpasil, Serpiloid) given orally may increase the output of hydrochloric acid.

Tobacco, Alcohol, and Ulcerogenic Drugs.—There is no conclusive evidence at present that average smoking increases gastric secretion significantly. The use of tobacco by ulcer patients is dealt with most practically on an individual basis. Moderate smoking seems without harm in many instances. Excessive smoking, on the other hand, is undesirable, perhaps because of the decreased intake of food and diminished neutralization of gastric acidity. In such instances, the habit should be discouraged. The recommendation of complete abstinence is preferable to the ineffectual suggestion of "decreasing" the quantity of tobacco. Excessive smoking ordinarily reflects increased nervous tension; the important problem, therefore, is relief of the emotional stress.

Since alcohol tends to increase the secretion of hydrochloric acid, its use should be avoided. Excessive drinking of coffee may irritate the gastroduodenal mucosa and reactivate peptic ulcer. Numerous medicaments may increase gastric secretion, irritate the stomach and the duodenum, and predispose the patient to the recurrence or new development of peptic ulcer, with bleeding. These compounds include salicylates, corticotropin (Acthar, Corticotropin, Depo-Acth), adrenal cortical steroids including prednisone (Deltasone, Deltra, Meticorten) and prednisolone (Delta Cortef, Hydeltra, Meticortelone, Sterolone), phenylbutazone

(Butazolidin), and reserpine. They should be avoided, if possible, in patients with known peptic ulcer or administered in conjunction with antacids.

Benign Gastric Ulcer

The foregoing principles of treatment apply to benign gastric ulcer as well as to duodenal ulcer. However, several aspects of this problem require additional comment.

Gastric ulcer resembles duodenal ulcer in symptoms and course. The pain mechanism, namely, acid irritation of exposed nerves in the ulcer crater, is the same. In contrast to duodenal ulcer, the output of hydrochloric acid in gastric ulcer is normal or low. Nevertheless, the complete and permanent absence of acid, developing "spontaneously," induced by gastric irradiation or after gastric resection, leads to complete healing. The therapeutic objectives, therefore, are identical with those in duodenal ulcer. The two principal differences are the differentiation of benign ulcer from malignant ulcer and the possible malignant transformation of benign gastric ulcer. The differentiation of benign from malignant ulcer, although difficult, is possible in most cases when all diagnostic methods are utilized, including x-ray, gastroscopy, and exfoliative cytology. Neoplastic transformation of benign gastric ulcer, a theoretical possibility, occurs rarely, if ever.

All patients with gastric ulcer should be hospitalized. Medical management is permissible when the total evidence indicates a benign ulcer and when the course of the lesion can be observed carefully at frequent intervals. The therapeutic test may be maintained for four to eight weeks, with periodic reevaluation; however, two or three months may be required for total healing of a benign ulcer. Many gastric ulcers heal completely during adequate treatment. Nevertheless, medical therapy is not as consistently effective as is desirable, and recurrences are frequent. On the other hand, partial gastric resection is successful in the great majority of cases. The recurrence rate is low because of the subnormal secretion of hydrochloric acid. Gastric resection is indicated under the following conditions: (1) inability to exclude malignant ulceration, (2) all ulcers on the greater curvature of the stomach (recognizing the fact that such lesions occasionally may be benign), (3) ulcers persisting despite adequate medical treatment, (4) recurrent bleeding, and (5) gastric ulcer complicated by delayed gastric emptying.

Jejunal Ulcer

Jejunal ulcer presents a difficult therapeutic problem because of the tendency of the lesion to penetrate, bleed, and perforate. Some patients respond to careful medical management in the hospital, including roentgen irradiation of the stomach, which is applicable to persons over 45 years of age. As a rule, however, surgery (transabdominal vagotomy, with or without further gastric resection, depending upon the circumstances) is preferred.

Gastrojejunocolic Fistula

Gastrojejunocolic fistula requires initially the restoration of nutrition with a diet high in proteins, calories, and supplements and the correction of electrolyte and fluid imbalance. The operative procedure consists of resection of the fistula, reconstruction by means of gastroenterostomy, and a more adequate gastric resection or vagotomy.

Complications

Intractable or Refractory Peptic Ulcer.—The term "intractable" ulcer implies a lesion not responding to the usual treatment and, therefore, one requiring operation. Intractability is interpreted differently, not necessarily critically, by different observers; "usual" therapy is not synonymous with "effective" treatment. The program prescribed in an individual case may be inadequate, or the patient may not adhere to the regimen because of a poor patient-physician relationship. Many cases classified as intractable undoubtedly belong in this category of apparent intractability. The ulcers actually are not refractory, for, under proper circumstances, they heal completely. In the truly intractable peptic ulcer, treatment ordinarily effective fails to promote healing or to prevent complications. The underlying cause may be serious emotional difficulties, uncontrollable gastric hypersecretion, decreased tissue resistance, or irreversible complications, such as obstruction or penetration of the ulcer with adherence to the pancreas. In evaluating an intractable peptic ulcer, careful study of all possible contributory factors is necessary.

Gastric Retention.—Gastric retention in patients with peptic ulcer usually is attributable to inflammation and edema adjacent to an active ulcer, temporarily narrowing the channel through the pylorus and duodenum. This complication often responds within 7 to 10 days to a medical regimen of no food or drink taken by mouth, continuous gastric aspiration, and the parenteral administration of electrolytes and fluids. The continuous removal of acid permits the ulcer to heal; the edema and inflammation subside, and the channel through the pylorus and duodenum once more is patent, as indicated by decreasing volumes of gastric aspirate and by the maintenance of or gain in body weight. The use of antispasmodic and anticholinergic compounds under these circumstances is undesirable, for the subsequent decrease in gastric motility may intensify the retention. In perhaps 15% of cases with retention, the obstruction is caused by scarring and cicatricial narrowing of the pylorus and duodenum. This type of obstruction requires surgical treatment, preferably gastroenterostomy and vagotomy, or partial gastric resection.

Acute Perforation.—Acute perforation is the most urgent indication for operation. Surgical treatment usually is limited to simple closure of the perforation, although in patients with a long history of ulcer recurrence, who are in good condition, partial

gastric resection also may be performed. Excellent therapeutic results apparently may be obtained with a program including prompt, continuous, and effective gastric aspiration, administration of adequate amounts of electrolytes, dextrose and water, sulfonamides, and antibiotics, and supportive care. The nonoperative approach is based upon the observation that early perforations will seal rapidly if the stomach is emptied and kept so by aspiration. It seems to be indicated especially in patients hospitalized approximately 24 hours or longer after the perforation and in individuals with difficult medical problems who are serious operative risks.

Massive Hemorrhage.—Hemorrhage complicates the course of peptic ulcer in perhaps 20 or 25% of cases; some patients appear to have a definite tendency to recurrent bleeding. Therapy usually is medical. It includes rest in bed and sedatives, such as 120 mg. of phenobarbital sodium given intramuscularly every four to six hours for restlessness. The blood type of the patient is determined and blood made available immediately. The hemoglobin level and the erythrocyte count or the hematocrit is measured daily or as often as the clinical course indicates. If the patient is vomiting, food and drink are withheld until the vomiting subsides. Otherwise, milk and cream and antacids are administered hourly during the day, as in the standard program; the alkali is continued every two hours during the night. Transfusions of whole blood, 500 to 600 cc., are administered when the systolic blood pressure falls to 100 mm. Hg, when the pulse rate exceeds 100, when the erythrocyte count decreases to below 3 million per cubic millimeter, or when there is continued severe hemorrhage, regardless of any criteria. In utilizing the pulse rate as an index of continued bleeding, measurements probably should be made with the patient in the sitting or the standing position, since the pulse rate with the patient horizontal may not increase significantly, despite considerable loss of blood. A preparation of 5% dextrose in isotonic sodium chloride solution may be administered subcutaneously in limited quantities. Additional measures may include the administration of antisecretory drugs and, infrequently, the intragastric drip. Gastric lavage with ice water or with hemostatic medication is not necessary. The antacid program is maintained until the erythrocyte count and the hematocrit are stabilized and the feces are negative for occult blood. The subsequent treatment is that outlined for uncomplicated peptic ulcer.

Surgery is indicated in bleeding peptic ulcer under the following conditions: (1) severe, persistent hemorrhage during medical treatment, (2) recurrent bleeding, (3) stomal ulcer with hemorrhage, (4) hemorrhage and perforation, and (5) hemorrhage and pyloric obstruction. The decision for operation usually is made during the first 48 or 72 hours, because complications and mortality rate rise with persistent uncontrolled hemorrhage. Occasionally, the decision may be deferred for several additional days, provided that the patient's general condition remains good and an adequate blood volume is maintained.

Bleeding is more severe and more likely to persist in patients 50 years of age and older than in younger persons; therefore, operation is indicated in older patients not responding promptly to medical treatment. A useful index is provided when two or more transfusions per day, or during a portion of a day, are insufficient to replace the blood lost, and the bleeding continues (the so-called test of transfusion). Since the hazards of surgery also are increased in this age range, the surgeon also must accept a higher calculated risk. The operation of choice in massive hemorrhage from peptic ulcer is partial gastric resection, excision of the lesion if possible, and ligation of the bleeding vessel. Gastroenterostomy alone or with vagotomy usually is not satisfactory for this purpose. "Blind" gastric resection may be performed to control bleeding from tiny gastric erosions, so small as to escape recognition clinically or at operation. Excellent results have been reported; however, opinions vary as to the routine applicability of the procedure. Surgery does not protect completely against recurrent hemorrhage, although the possibility is greatly reduced.

Prevention of Recurrences

The immediate results of effective therapy in peptic ulcer are good, with prompt relief of pain and complete healing. The long-term results are less encouraging, perhaps because of failure to maintain adequate and continuous neutralization of the acid gastric content. Recurrences of peptic ulcer are frequent with almost any type of therapy, medical or surgical, which does not abolish acid secretion permanently. The precipitating factors recognized and emphasized most often are physical fatigue, emotional stress, dietary indiscretions, irritating drugs, and intercurrent illness. There are no specific measures completely protecting against recurrences, except the production of anacidity. However, the tendency to recurrences may be lessened and their severity decreased by a comprehensive program, including (1) thorough treatment of the initial lesion and careful supervision of the patient subsequently, (2) education of the patient as to the nature of the disease and the principles and objectives of treatment, (3) continued use of a bland diet, (4) a practical but efficient program of acid control, (5) avoidance of alcohol, tobacco, and irritating drugs, (6) sufficient rest and sleep, (7) control of emotional problems, if possible, and (8) proper care of respiratory infections and other intercurrent illness.

Conclusion

Despite the limitations of medical management, current methods of treatment, when applied properly, are effective in the vast majority of patients with uncomplicated peptic ulcer. Treatment should not be confined to a single therapeutic measure.

The emphasis should be on total management, including use of antacids, anticholinergic drugs, and sedatives, avoidance of gastrointestinal irritants, and skillful attention to emotional problems. Inadequate results usually are attributable to inadequate therapy. The fact that treatment is more or less nonspecific does not justify its casual and indifferent application. The continued study of hormonal factors, of drugs acting upon enzyme systems implicated in the process of gastric secretion, and of secretory inhibitors in the gastric content eventually may yield a medical technique for producing sustained gastric anacidity. The cure of peptic ulcer obviously will depend upon further knowledge of its pathogenesis, especially the nature of tissue resistance and the mechanism of secretion of hydrochloric acid.

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MEDICINE AT WORK

GUARDIANS OF THE M.D. OATH

THOUSANDS OF GRIEVANCE COMMITTEE MEMBERS ARE THE MUSCLE OF MEDICINE'S HIDDEN STRENGTH

Milton Golin

"... I will keep pure and holy both my life and my art..."
—Oath of Hippocrates

"Am I my brother's keeper?"
—Genesis IV, 9

A California physician, suing to collect a bill which his colleagues had formally condemned as way out of line, loses out when they unhesitatingly testify for the patient. Two lawsuits are avoided in Dumas, Ark., where a medical society panel of physicians and laymen amicably resolve separate doctor-patient disagreements. A Colorado doctor adjusts an excessive fee rather than face "trial" before his medical peers.

These events illustrate the bridging of two millenniums—from the time of the ancient phrases quoted above to a revolutionary trend which began growing only in the past decade. This trend now has the vast majority of American physicians embracing the thesis that by being their professional brother's keeper they are keeping their art pure and holy.

It was not always so. Early medical organizations were patterned after guilds or fraternal lodges, which essentially set themselves apart from society at large. Although many individual physicians did not welcome such isolation, it did bolster a needed comradeship at times when a pitiful sparseness of medical knowledge might make doctors the favorite target of public abuse. A large body of physicians philosophically regarded lay criticism as an occupational hazard of the medical profession, feeling that an endeavor so intimately concerned with the human body is bound to evoke intimate comment from that body: He is "a good doctor" or "a bad doctor"; he charged "a reasonable fee" or he charged "an exorbitant fee"; he "should not have operated" or "it's certainly a good thing he did operate."

Fig. 1.—Orange County (Fla.) Medical Society grievance committee in session last month. Woman patient tells her story to (*left to right*) Drs. Norman F. Coulter, Charles J. Collins, Lawrence H. Kingsbury, and William S. Mitchell (chairman).

When the Massachusetts Medical Society established its Committee on Ethics and Discipline—the profession's first grievance committee—in 1871, there were some murmurings of discontent among

physicians: "This only makes things worse and it isn't any use to stir up trouble." "The public brings in ill-founded and nuisance complaints." "It isn't anybody else's business what a doctor charges." "You only aggravate the involved doctor and the patient becomes disquieted at more doctors."

Little by little over the years—slowly, because the committee was not publicized—patients' complaints against some Massachusetts physicians were bringing a new kind of dignity to the profession. At last here was a device for protecting the mass of honest doctors from the few who were smirching medicine's name. Even more important was the opening of communications for physicians and patients to explain some of their mutual problems—why a certain fee is charged and what happens when a specific therapeutic measure is taken; the impossibility of guaranteeing cure and the consequences of no treatment at all; difficulties in diagnosis and difficulties in meeting some medical costs.

This newly opened line between doctor and patient was beginning to reveal to the public that physicians do not cover up each other's mistakes and that medicine is not a closely knit protective fraternity, complete with secret passwords.

Despite a lack of publicity, word of the Massachusetts society's successes in bettering public relations and uplifting medical ethics reached doctors in other communities. But still it seemed too large a step for most medical societies to take—imagine, setting up a complaint desk for patients!

Cleanup in California

A still-unenlightened public, meanwhile, was beginning to hear some distorted stories and outright slanders against doctors at a time when medicine was entering an era of scientific advancement that should have insured its good repute as never before. Some dissatisfied patients were taking out their anger on all doctors, and not just on those who may have disappointed them. Not all the stories were distortions. In northern California, for example, one physician probably saved the sight of a young girl's eye by removing a splinter—then demanded immediate payment of a $1,200 fee, even after her parents were able to prove they could not afford to pay that much. Officials of the Alameda-Contra Costa County Medical Association pleaded with the eye doctor, and ended up by denouncing him.

Right then and there, these California medical men grasped the truth in the FBI slogan: "One man can't build a big organization but one man can tear it down." They began surveying medical practice in their community and found more evidence that called for action—several other physicians charging excessive fees, some shielding of incompetents, absence of an emergency medical service plan. Finally, when one local doctor sued a patient to collect a $70 fee for minor services valued at certainly no more than $10, the society marshalled four specialists who testified that the bill was too high. The suing doctor lost his case, and physicians from scattered parts of the nation sent in expressions of warm approval of the society's role.

Among changes brought about by Alameda-area doctors were the establishment of a 'round-the-clock emergency call system and the adoption of a voluntary medical care policy best described by this ad they placed in local newspapers:

> WANTED: Information concerning anyone in Alameda County who believes he cannot get needed medical care because he hasn't the means to pay his doctor. Call the Alameda County Medical Association, through which the ethical private physicians in this county guarantee medical care for everyone.

The association's executive secretary publicly spelled it out in detail: "We accept the broad responsibilities for the delivery of needed medical care to everyone, regardless of the time, the day, the patient's inability to pay, or any other consideration. The association seeks to protect patients from—or to gain redress or compensation for—injury, neglect, incompetence, excessive fees, or any other malpractice or unethical act of its members. It attempts to maintain a suitable climate for constructive competition under a free enterprise system which constantly improves the quality and holds down the cost of medical care."

In 1947, just about the time this new program was getting under way in California, the Colorado State Medical Society took a forthright step which also won high praise from the profession at large, and at the same time made headlines which evoked applause from the public throughout the United States. The Colorado society announced publicly the formation of a sort of "grand jury" of physicians not only to hear complaints of patients but to initiate investigations of its own. This grievance committee, made up of 12 doctors elected by their colleagues in the society's House of Delegates, exerts its right to file charges with a local medical society in Colorado, the state society, the state board of medical examiners, or any prosecuting attorney in Colorado.

It was the Colorado society's action, more than any other, which sparked the broad-scale establishment of medical grievance panels in communities all across the nation. As medical societies began looking for guidance in setting up these panels, the American Medical Association's policy-making House of Delegates in 1954 authorized Dr. J. P. Culpepper Jr. of Hattiesburg, Miss., to lead a special two-year study for developing guides for grievance committees.

Now 1,100 Committees

The number of these committees is growing rapidly. Today every state and territorial medical association has a group of doctors (variously called

—according to local preference—"grievance" boards, "mediation" committees, and a dozen other titles) to handle complaints from patients. Estimates based on a survey made several months ago by the A. M. A. Council on Medical Service indicate that there are some 1,100 grievance committees among the approximately 2,000 county medical societies in the United States—and the number is still growing. More than 200 were formed in the last four years alone.

Serving on these committees are between 5,000 and 10,000 physicians (the number on each panel has been fluctuating as the societies attempt to refine their operations) who have become prime guardians of the Hippocratic Oath. It is these doctors who are drawing the lines of medicine's new look. And it is their fearless willingness to judge complaints routinely in the twin light of public interest and professional service which is setting the standard for an expanding age of free-enterprise medicine.

As one example of this routine fearlessness, when grievance committee members in a large Eastern city recently upheld a series of complaints, they published these blunt comments about their now-wiser colleagues:

"Engaged obstetrician should not have charged full fee when substitute did service."

"Doctor gave improper handling by calling police on erroneous impression patient was drunk, when actually suffered neurological condition."

"Fee for prenatal visits considered excessive."

"Doctor charged over Blue Shield allowance based on family income limit."

"Physician freely admitted he gave wrong laboratory report."

"Patient (in poor family economic situation) probably not adequately told of cost of medical care."

Recognizing the high-principled courage behind statements such as those, Dr. Louis H. Bauer, former A. M. A. President, has said: "Unethical practices can be eliminated by grievance or mediation committees made up of members with steel in their backbones." He might have added that members also need the tact of a diplomat in resolving certain disputes informally—so that these may bypass the formal hearing stage—and in keeping a patient happy while proving to him that his particular complaint may not be justified. Here are a few instances of unjustified complaint:

—One patient in a West Coast city protested bitterly to a grievance committee that he was charged $40 for "just one office visit." Investigation disclosed that, at his own request, the visit entailed a thorough examination including fluoroscope study, electrocardiogram, and the benefits of extensive laboratory work. When he understood what the fee covered, he withdrew the complaint with apologies.

—A Nashville woman complained to the Davidson County Medical Society grievance committee: "I was in my doctor's office for only an hour. He made two house calls and sent me a bill for $100." It was brought out, however, that the office visit involved a series of x-rays, various tests, and the fitting (with subsequent checkups for fit in her home) of a special corset for proper support of the woman's injured back. When the reasonableness of the charge was pointed out, the bill was paid immediately.

—A Chicago woman told a grievance committee that her doctor was "arrogant" because he took her full pack of cigarettes when she offered him only one. It turned out, to the woman's later satisfaction, that he had pocketed the pack absent-mindedly.

These incidents point up the fact that, by far, the large majority of complaints against doctors are due not to incompetence or greed but to misunderstandings—misunderstandings which could have been dispelled quickly if there had been an

Fig. 2.—First photo ever published of grievance committee members of the Colorado State Medical Society, which sparked the growth of such mediation panels throughout the U. S. in 1947. Front row (*left to right*): Drs. James S. Orr, Freeman H. Longwell, Kenneth H. Beebe (chairman), and William Baker. Standing are Drs. John Simon Jr., Paul Tramp, Joel R. Husted, and Robert H. Smith. Members not shown are Drs. George D. Balderston, Gordon H. Vandiver, Walter M. Boyd, and Ligon Price. Committee last met on March 15.

opportunity to determine the causes in frank discussion. "Misunderstanding" was the culprit in Philadelphia, where a stubborn businessman refused to pay for a stomach operation because, he said, doctors never told him "what had been taken out and what left in." A young New Yorker, grieving over his wife's death from uterine cancer, might not have blamed her physician had the husband understood the hazards of her condition.

Last summer a doctor-patient misunderstanding erupted in newspaper headlines when a Manorville, N. Y., specialist submitted a $1,500 bill for 'round-the-clock services which helped save a boy who

was trapped in a well. There was controversy over the parents' failure to compensate the doctor while they disbursed contributed funds to salaried rescue workers, and as to their ability to pay a fee ordinarily considered quite reasonable for the professional skill and long hours involved. The physician's medical society grievance committee met with him, and in 24 hours they announced that the entire bill had been cancelled. Later, Dr. Edwin S. Hamilton, Chairman of the A. M. A. Board of Trustees, announced: "Rarely has the value of such a local mediation committee been so clearly demonstrated."

Integral Part of Medicine

All over America, medical organizations are telling doctors and patients alike that such a value has now—after 10 years—made the grievance committee concept an integral part of the profession:

—"Most doctors are wonderful men who want to do the right thing for their patients," announced Rollen Waterson while executive secretary of the Alameda–Contra Costa Medical Association. "Now they've finally realized that 'doing the right thing' means they must also protect patients against the few doctors who are incompetent or dishonest, and who are smirching the reputation of the entire medical profession."

—A report in the journal, *New York Medicine*, states: "Our grievance committee feels it has served a useful function in public relations, not only in helping iron out disputes arising between patients and physicians but also in a prophylactic sense—by helping to prevent such complaints from arising. We now find doctors, aware of our existence, calling us up for guidance."

Fees

So many complaints have been caused by a misunderstanding of the basis for a doctor's fee that grievance committees spend a good deal of time emphasizing the importance of discussing costs before, and itemizing bills after, medical service. "Some doctors seem to be just too high-hat to discuss these things [diagnostic and therapeutic procedures and costs]," said the first chairman of the Colorado State Medical Society's grievance committee. "If they would take just a little more time with each patient 75% of the complaints would never arise."

The Philadelphia County Medical Society reports that out of 28 cases handled by its professional relations committee during the first part of last year, "in 14 the difficulty need not have arisen if the medical man had been sure that the patient or his family knew the approximate fee that would be involved."

The A. M. A. has taken a double-barreled approach on fees—on the one hand conducting an intensive campaign for prior discussion between patient and physician, and on the other hand calling upon constituent and component medical societies to crack down on the few doctors who have been gouging. Today more than 20,000 doctors' offices display an A. M. A.—distributed plaque which carries this message:

> TO MY PATIENTS:
> I invite you to discuss frankly with me any questions regarding my services or my fees. The best medical service is based on a friendly mutual understanding between doctor and patient.

That same statement is in a leaflet which has been distributed to nearly 4 million patients by their physicians. The A. M. A. Board of Trustees, meanwhile, states that "it looks with disfavor on the few members of the association who charge excessive fees. It urges state and county societies to discipline those members who, after a fair hearing and decision that the fees charged have been excessive, refuse to reduce their fees to a level that is reasonable for the services rendered."

In many communities, grievance panels have taken up the challenge; in a few they have hesitated. For example, one southern dermatologist lost his court suit to collect a bill for $200 after his own medical society provided the patient with a lawyer and four physicians to argue that the fee was excessive, but in a midwestern community there still is no grievance committee action many months after a patient complained that his doctor billed him $1,500 for nothing more than three weeks of daily hospital visits with diet instructions. In one New York suburb, the county society's grievance committee dressed down a physician for having the nerve to submit a $200 bill to a woman who nearly died of peritonitis because he failed after three days to make an ordinarily simple diagnosis of appendicitis, but in another metropolitan area a grievance committee still has not satisfied a number of complaints that its own medical society routinely demands that every caller for emergency medical care have a specified minimum amount of cash on hand to pay the doctor (a check or voucher will not do).

Lay Membership

Despite ample evidence that grievance committees are operated in the public interest (one woman on the West Coast says, "In our community we all know the doctors are working to protect us, not other doctors' careers") some skeptics have asked why laymen are not allowed to serve on grievance committees "so there will be no whitewash of those few bad doctors." (The Reverend Paul Reagor, after sitting in regularly as a "public observer" for the medical society of Alameda, said, "If there has been any covering up for guilty physicians, I certainly have never seen it.")

As a matter of fact, at least a dozen grievance committees do have lay members—and at the invitation of the physicians themselves. In one case (among many elsewhere in the nation) a minister,

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a business school dean, and a local merchant serving with doctors on the Douglas County (Kan.) Medical Society grievance committee resolutely decided that a patient's complaint definitely was not justified. A clergyman, an auto dealer, and a plantation owner serving with physicians on the Desha County (Ark.) Medical Society grievance committee settled two cases "which saved us from lawsuits," according to Dr. G. U. Robinson, the society's secretary.

Jack Drury, lay executive secretary of the Davidson County Medical Association in Nashville, says: "We would not attempt to operate our grievance committee without at least one lay member. That's the way the society and the people like it." Three laymen served with physicians as grievance committee members for the Cumberland County (Pa.) Medical Society. "In one session involving fees," recalls the former secretary-treasurer, Dr. Richard R. Spahr, "the finding was against the physician for overcharging—he had that reputation for some years." The Sullivan-Johnson Counties (Tenn.) Medical Society has two separate grievance committees, including lawyers and businessmen, to serve adjacent communities. "Two years ago we avoided a lawsuit by settling a patient's complaint against two doctors and a private hospital," says Dr. Frank W. Sutterlin, who was serving then as secretary.

"Inclusion of laymen in grievance committees is still in the experimental stage," reports the A. M. A. Council on Medical Service. "But they may serve to strengthen community trust in the impartial attitude of the committee by assuring the representation of the patient's viewpoint, and serving to emphasize the profession's interest in public policy."

Although nonphysician members offer certain values to some grievance committees, a number of experienced laymen and doctors alike see some over-riding disadvantages in such an arrangement.

SOME COMMENT ON GRIEVANCE COMMITTEES . . .

"If we individual physicians do not keep medicine's house in order, outside organizations—like hospitals or government—will do it for us. That is why medical grievance committees are protecting the honest and capable physician as much as they are the patient."
—*Dr. David B. Allman, president of the American Medical Association.*

"While it is never pleasant to find a colleague guilty and impose punishment, this is a responsibility falling on some of us. . . . If local societies fail to curtail unethical practices, ethics lose their effectiveness."
—*A. M. A. Judicial Council.*

"Unethical practices can be eliminated by grievance or mediation committees made up of members with steel in their backbones."
—*Dr. Louis H. Bauer, when retiring as A. M. A. President.*

"The whole profession should not be tarred with the same stick which should be applied to the few."
—*Dr. Edward J. McCormick on becoming A. M. A. President in 1953.*

"The ethics of medicine were written and are enforced to protect the interests of the public. When any professional act by your doctor is opposed to the public interest, he is guilty of unethical conduct."
—*The Texas State Medical Association in a publicly distributed leaflet.*

"You cannot afford to protect the doctor who is not faithful to his vows and to the highest ideals of the profession."
—*Louis B. Seltzer, Cleveland newspaper editor, addressing an A. M. A. convention.*

"Most doctors are wonderful men who want to do the right thing for their patients. Now they've finally realized that 'doing the right thing' means they must also protect patients against the few doctors who are incompetent or dishonest, and who are smirching the reputation of the entire medical profession."
—*Rollen Waterson, while executive secretary of the Alameda–Contra Costa (Calif.) Medical Association.*

"The aim of a grievance committee—whether some committee members know it or not—is simple and sufficient: To clean medicine's house and to better public relations."
—*Dr. H. Sheridan Baketel in the* Bulletin *of the Pottawatomie County (Okla.) Medical Society.*

"Let us not forget that we are enfranchised by the public and that only as long as we serve it will our franchise continue."
—*Dr. Francis T. Hodges, while president of the California Academy of General Practice.*

"It's the bad apple in the barrel that causes complaint. . . . The medical profession cannot afford to shelter the not-so-ethical man. . . . Disciplinary action, when justified, strengthens the position of the profession in the eyes of the people."
—PR Doctor, *Published by the A. M. A.*

"The mediation committee can do more for the physician than any other single committee within the medical society. Mediation committees that function ethically and effectively will be a great factor in avoiding the political control of medicine and, in addition, they can and do protect the economic and professional status and freedom of the physicians by acting at all times in the best interests of the public."
—*Dr. Robert E. Fitzgerald in* Minnesota Medicine.

"If the doctors can use the [grievance] committee to eliminate the complaints arising from their fees, either by explaining the reasons for them satisfactorily or by forcing reductions where some members get out of line, more will be done to still the clamor for a national compulsory health insurance than in any other way."
—*Dr. George W. Harrison, while president of the Oklahoma State Medical Association.*

Officers of one East Coast medical society revoked the committee memberships of its attorney and its lay executive secretary on the ground that their presence during hearings on confidential matters might violate privileged communications between doctors and patients. An adjacent medical society gave the same reason in turning down its executive secretary's suggestion that the complaining patient be allowed to bring along the clergyman of his faith to the grievance committee session.

Harvey T. Sethman, who is lay executive secretary of the trail-blazing Colorado State Medical Society, seconds that reasoning and offers what he believes to be an equally potent argument against lay membership: "Such a procedure weakens the major point of the whole system of self-discipline because it takes the 'self' out of self-discipline."

What a Committee Is and Does

While almost every grievance committee is made up entirely of physicians, ranging in number from one to 27, its manner of organization and make-up varies from society to society. In some communities, members are elected by their colleagues, and in others they are appointed by the society president. The Oklahoma, Florida, and Virginia state medical association grievance committees are comprised of past-presidents—on the "elder statesman" theory that these men possess particularly experienced and dispassionate judgments. Other societies pointedly reject such a plan, contending that past-presidents are more likely to face acquaintances among doctors accused by patients and would tend toward more bias than would other physicians.

Fig. 3.—Nashville (Tenn.) Academy of Medicine's grievance committee of four physicians and one layman hears a complaint brought by a patient (back to camera). *Left to right* are Mr. Lee Sanders, Drs. Louis Rosenfeld (chairman), Robert Finks, Eugene Johnson, and Harrison Shull. Mr. Sanders has been a member of the committee since 1952.

Many state grievance committees serve as "appeal boards" when a county-level committee cannot bring about agreement. They may also serve as basic hearing panels for areas too thinly populated to have committees of their own. Wherever possible, hearings at the community level are encouraged, to emphasize the profession's neighborly concern for patients and the efficacy of local decisions.

In virtually all cases, a grievance committee does not mete out punishment when it finds a complaint justified. "You cannot be prosecutor, judge, and jury all in one body," says a spokesman of the Colorado society. "There have been court cases where county society disciplinary actions have been set aside for that very reason." A special committee of the A. M. A. House of Delegates reported: "Discipline is not a proper function of a grievance committee under any circumstance. Where a grievance committee finds that disciplinary measures are indicated, it should so recommend to the appropriate judicial body of the association."

Punishment may take the form of a reprimand, limited suspension of membership, or even expulsion. In addition, some grievance committees have brought in medical specialists to provide free remedial care for patients who have made justified complaints of harmful treatment.

Doctors have learned that one way to head off a complaint is to anticipate it—nip it at the source before the patient gets hurt. When the A. M. A.'s special committee surveyed grievance panel operations in 1955 (Chairman Culpepper believes the time is ripe for a re-survey) it found a number of medical society leaders recommending that mediation boards also have the power to initiate investigations. Many complaints could thus be avoided.

In one state, the survey team reported: "All seemed aware of a 'bad situation' in the staff of a certain town's hospital, with no tissue committee or other check on the surgery done there, with consequent rumors among both the profession and the laity that are damaging to the profession generally—but nobody has 'filed a complaint' and nobody will."

In another state recently there was talk but no action (one complaint was pending, at last report) by county society grievance committee members when officials of a nearby hospital removed a local surgeon's privilege to practice there—then went to court and formally accused him of 25 incidents of unprofessional practice, including needless surgery, in which six patients died. (The physician flatly denies the charges.) The A. M. A. study group recommends that grievance committees be empowered to launch their own fact-finding projects.

Yet, it is in the role of inquirer that committees often face a ticklish problem: How to convince a doctor that his invitation or summons to a hearing in no way places him "on trial." His testimony can be of tremendous help to the entire profession, even when it does not relate to any patient's complaint.

Making It Known

Mere existence of a grievance committee is valueless unless it is made known to both the profession and the community. "This service cannot

succeed unless the public knows of its existence and understands how to use it," according to the A. M. A. Council on Medical Service. "It is highly inconsistent for a medical society to set up a mediation committee and then keep it a secret from the public. Some physicians fear that a mediation committee will evoke complaints from a greater number of cranks and psychopaths. This has not proved to be the case where mediation committees function and are well publicized."

Nevertheless, some medical societies continue to hide the light of one of medicine's brightest achievements—the grievance committee—under a bushel. Theirs is a committee in name only; it serves no real purpose. One medical society official in Illinois makes this naïve comment: "No, we don't publicize the fact that we have a grievance committee. We've met only four times in the past four years because our troubles are nonexistent." A doctor in Florida says, "We don't announce our committee but I'm sure everybody around here knows about it." A New York physician says he is being frank when he expresses fear that "publicity would only invite complaints."

Yet an A. M. A. survey of 18 state medical associations, which make a policy of frequently announcing operation of their grievance committees, revealed that the number of complaints had not increased (in some, had decreased) and that not one had suffered adverse publicity of its committee in the lay press. On the positive side, one of these associations reported: "The key to the prevention of grievances is publicity." An executive of another state medical society commented, "By repeatedly making known that a grievance committee is functioning, we have killed off much of the back fence gossip, coffee cup slander, and scandalous whispers which have harmed the many honest doctors in this state." A third said: "This committee has definitely improved standards of medicine in our community. Its existence, made known in newspaper ads and broadcast announcements, seems to have been a deterrent to wrongs we know had been done by a small group of physicians, and has brought about a better public attitude toward the profession."

Says the A. M. A.'s immediate past-president, Dr. Dwight H. Murray: "I cannot understand why anyone should be fearful of attracting complaints to a channel where they could be disposed of intelligently. A person with a real or imaginary grievance against his physician will circulate his complaint among his neighbors and throughout the community unless he knows there is a place where he can take his problem and get a hearing."

Equally important is the ethics value of grievance committee publicity. In one state not long ago an internist referred a patient to a surgeon for a stomach operation, and later submitted an $800 bill for merely changing dressings and making diet suggestions. Invited before the local grievance committee, this physician was persuaded to reduce his bill to a more appropriate $200. However, a few other doctors in the same community also had been charging excessive fees but they were unable to benefit from the internist's experience—simply because they were not informed of the committee's action. (For reasons of privacy, of course, action reports never include names of individuals.) As a result the grievance panel has had to handle additional cases from patients complaining of fees.

"As things stand now," writes Dr. H. Sheridan Baketel in an editorial in the *Bulletin* of the Pottawatomie County (Okla.) Medical Society, "when some grievance committees discipline a doctor only a handful of people know what for. So the offense, whatever it was, may well be repeated by others. Effective publicity means letting the public and the profession in general know what kind of grievances patients are giving vent to and what medicine is doing about them. We don't want to go on adjudicating a lot of grievances indefinitely. We want to prevent them from occurring. So far there has been altogether too much talk about how many medical societies have grievance committees and not enough about how much those committees are accomplishing."

Certainly this is not true in Colorado, where periodic announcements of state medical society grievance committee decisions serve as a reminder for present members and as information to new members that such a panel does exist—with a purpose and with obligations placed on members. "The net result of all this publicity has been a tremendously increased public confidence in the medical profession in our state," says Executive Secretary Sethman. "Time and again prominent laymen have openly expressed their gratitude for the existence of this mechanism."

Challenge and Opportunity

There is a great difference between a few laymen praising a grievance committee and a mass of Americans accepting the effectiveness of such panels as a matter of course. Herein lies the broad challenge-opportunity which is being taken with increasing vigor by the more than 5,000 physicians who are grievance committee members. In their judiciousness lies a great and good "hidden" strength of freely organized medicine. What is this strength? It is the spontaneous will to do good for good's sake, and not for the sake of alien "authority."

A survey report which led to the pioneering medical grievance panel in Colorado points out: "Unless it wishes to surrender additional areas to governmental jurisdiction, a profession must at all times formulate and enforce stricter standards than the law currently demands." Here is the way one leading physician, Dr. James M. Leffel, focused that same viewpoint on medicine, in the *Journal of the Indiana State Medical Association:* "We must put our house in order, for if we do not, someone will do it for us. If we stand for what is right, no one can destroy us. If we face and accept our obligations, we can live up to our magnificent heritage."

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IRON ABSORPTION

AS POINTED out in this issue (page 1685), iron is a specific for iron-deficiency anemia. However, in order to be effective when given by mouth it must be absorbed. The four methods of studying iron absorption have been evaluated by Josephs [1] in an effort to determine which is most reliable. The older chemical method of determining iron balance measured the difference between the amount of iron ingested and the amount recovered in the feces. While this method is difficult, expensive, and subject to inadvertent errors, it has the advantage that long-continued and repeated periods of observation in a single subject may be made. This is not true of the easier balance studies with radioactive iron. A third method, by which the amount of absorption is inferred from the amount of iron utilized for hemoglobin formation, assumes that if iron is not utilized for this purpose it is not absorbed. This assumption is not always true. In the fourth method the curve of serum iron level after a test dose of iron has been given by mouth is determined. Although a high postabsorptive curve could only mean good absorption, a less high or flat curve does not necessarily mean poorer absorption unless one knows that there is no diversion of iron to the tissues. The rate of such diversion would have to be considered. Josephs believes that iron balance studies still constitute the standard by which the results of the other methods should be judged.

Bothwell and co-workers [2] used different methods of measuring iron absorption, including a double isotope procedure. They concluded that the method of choice depends on the problem to be solved. Although for most of their studies they preferred the double isotope method because of its simplicity and accuracy, this method cannot be used when there is complete failure of erythropoiesis.

Iron ingested in the ferrous form is largely absorbed in the duodenum. The larger the dose the more is absorbed in persons with iron deficiency, but in normal subjects only the daily requirement is absorbed regardless of the amount ingested. The taking of iron with a meal reduces iron absorption by about 50%. Pirzio-Biroli and co-workers [3] found that the absorption of iron from foods by normal and iron-deficient subjects was lower than when iron salts alone were given. Supplemental ascorbic acid decreased this difference. Absorption of iron from foods also varied inversely with the amount of iron stored in the body and directly with the amount of the subject's erythropoietic activity. Ascorbic acid in doses of 100 to 1,000 mg. and cobalt chloride in doses of 80 to 120 mg. daily for one or two weeks did not improve the results of iron therapy.[3]

Once iron is absorbed through the mucosal cells of the digestive tract, where its presence as ferritin is a form of temporary storage, it is passed on into the plasma at a rate that ordinarily does not increase the plasma iron level. It is taken up almost entirely by the marrow, replacing the small amount lost daily in the hemoglobin cycle (about 1 mg. a day). When absorbed in amounts exceeding this requirement or when erythropoietic activity is reduced, it is taken up by the liver for later transport to the marrow.

There is still much to be learned about iron absorption. The rate of absorption varies widely in normal subjects, the reason for which is not clear. As a result of his studies Josephs concluded that the increased rate of iron absorption in patients

1. Josephs, H. W.: Absorption of Iron as Problem in Human Physiology, Blood **13**:1-54 (Jan.) 1958.
2. Bothwell, T. H.; Pirzio-Biroli, G.; and Finch, C. A.: Iron Absorption, J. Lab. & Clin. Med. **51**:24-36 (Jan.) 1958.
3. Pirzio-Biroli, G.; Bothwell, T. H.; and Finch, C. A.: Iron Absorption, J. Lab & Clin. Med. **51**:37-48 (Jan.) 1958.

with iron-deficiency anemia is due to hemoglobin reduction and perhaps to increased erythropoietic activity rather than to a depletion of the body's iron storage.

GRIEVANCE COMMITTEES

Medical grievance committees are not new on the American scene. Since 1871, for example, the Committee on Ethics and Discipline of the Massachusetts Medical Society has been mediating the complaints of patients. What is new, though, is the expansion of these groups across the nation. Less than a dozen were functioning a decade ago when the Colorado State Medical Society made headlines and won praise from the profession at large for its pioneering "medical grand jury" which acted on its own initiative as well as on specific complaints.

Before long, leaders in the profession were realizing that here was something which could protect both its good name and the public interest. Late in 1954 the House of Delegates of the American Medical Association authorized a special study to develop guides for grievance committees.

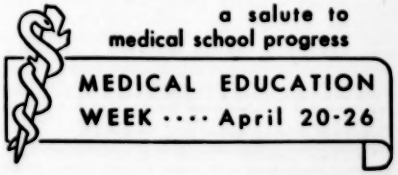
From a few, the number of these committees has grown by leaps and bounds, until every state medical association can now boast a group of doctors responsible for the formal hearing of complaints from patients. And it has not taken long for hundreds of county medical societies to follow this lead. The trend is still developing. Over two-thirds of the 986 county societies surveyed last year by the A. M. A. Council on Medical Service had such committees. More than 200 of the panels were formed in the past four years alone. A projection of this survey to encompass the approximately 2,000 medical societies in the United States would indicate the existence of 1,100 grievance committees, comprising perhaps 5,000 to 10,000 physicians who serve 95% of our population.

What impact is this trend having on physician-patient relationships? On the general public's regard for doctors? On medical service itself? On the future of free medicine? "Medicine At Work" (page 1735) explores these questions in the light of grievance committee experiences in scattered parts of the United States. One conclusion appears certain: The grievance committee is here to stay as an integral part of our profession. In the years ahead, only technique may need refinement of the sort that is being trail-blazed today by some medical societies.

The ultimate aim of a grievance committee may well lie in the application of medicine's traditional three functions—preventive medicine, treatment, and rehabilitation—to the medical organization's judicial role. This extension of concept challenges the profession to continually strive for a reduction in the number of patients' complaints, to act forthrightly and fairly in resolving the relatively few which do arise, and to follow through with positive action in support of its findings.

WHERE THE MONEY GOES

Do you know how much money is being spent by the federal government on vocational rehabilitation, cancer, mental health, maternal and child welfare, or heart studies? If not, it might be interesting to turn to the Washington News in this issue, where you will find figures not in the thousands or even hundreds of thousands but in the millions. Various health and welfare activities in the Department of Health, Education, and Welfare alone are now big business activities. Vocational education is supported by current spending of more than 33 million dollars, vocational rehabilitation by 52 million, general aid to the states by 22 million, hospitals and medical care (not including the Hill-Burton program) by 44 million, maternal and child welfare by 41 million, and the National Institutes of Health by 189 million dollars. Without ready information on the number of taxpayers in this country, it is not possible to determine how many dollars each taxpayer pays in taxes each year for the support of HEW. But at least it is enough for all doctors to take a personal interest in how their money is spent in health activities, how effective these services are for their communities, and what influence they may have on their patients. If the services are worth while, doctors should know about them and understand them. If they are not, or something better can be substituted, this is a problem concerning which there should be no lack of understanding.



ORGANIZATION SECTION

EXERCISE AND FITNESS

A statement on the role of exercise in fitness by a joint committee of the American Medical Association and the American Association for Health, Physical Education, and Recreation

Fitness has many components, including intellectual and emotional, as well as physical, factors. These differ in relative importance from one period of life to another, depending upon varying individual roles and responsibilities. But in every part of life, each of these factors is important for effective living.

Fitness for living rests first of all upon a solid foundation of basic good health. Be it in the home, on the farm, in the factory, or in military service, fitness for living implies freedom from disease; enough strength, agility, endurance, and skill to meet the demands of daily living; reserves sufficient to withstand ordinary stresses without strain; and mental and emotional adjustment appropriate to the maturity of the individual. Physical fitness is but one element in total fitness. The top limits one can achieve in fitness are determined largely by inheritance. However, the extent to which the individual develops his potential for fitness is dependent upon his daily living practices including exercise habits.

Along with exercise, adequate nutrition, sufficient rest and relaxation, suitable work, the use of medical and dental services, and the avoidance of excesses are all important in maintaining fitness. This report, however, is intentionally limited to the place of exercise in the total program of fitness. Points of special emphasis are, first, that the living body is responsive to training, and, second, that the body operates under wide margins of safety and is remarkably resistant to strain.

Changes have taken place in modern living, including increased availability of easy modes of transportation and labor-saving machinery. As a result, more and more persons have tended toward a sedentary existence. From time to time in emergencies of various types, sudden and unusual physical demands may be laid upon individuals and groups. The possession of physical strength, agility, and endurance may enable the individual or group to survive, while the lack of fitness may spell catastrophe.

For purposes of this report, the desirability of fitness for the individual and for the nation is assumed. Here, the aim is to delineate the contributions of exercise to the development and maintenance of fitness. A medical examination to establish the fundamental soundness of the body is a prerequisite to any regimen of vigorous exercise.

Physiological Factors

The normal heart and circulatory system become more efficient in moving blood to active regions when repeatedly required to do so. Coincident to this development, improved pulmonary ventilation also results. The demand for increased circulation and pulmonary ventilation incident to protracted exercise is reflected primarily in an improved and more economical pumping action of the heart. Games and sports involving extended running, vigorous swimming and dancing, and other sorts of forceful effort serve this purpose. Prolonged inactivity, on the other hand, is marked by a decline in circulatory and pulmonary efficiency.

The ability of the body to function according to purposeful patterns is vested in the central nervous system. With practice and conditioning, many movement patterns become second nature and almost automatic. Adaptability of the nervous system is such as to permit proficiency in an almost unlimited variety of motor activities.

An individual's ultimate performance is limited by the physiological capacity of the body systems involved. Usually the individual reduces or discontinues his performance long before physiological limits are reached—when relatively slight fatigue sets in or in the presence of such mental factors as fear of overdoing. Such subjective factors as a feeling of breathlessness, general weakness, or muscular discomfort evoke reduction or cessation of activity. These may be conscious or subconscious inhibitions and are psychological rather than physiological in nature.

Athletes, who learn to carry their activity beyond the so-called psychological quitting time, sometimes experience a phenomenon known as "second wind," which represents a physiological adjustment

Members of the Committee were as follows. From the A. M. A.: Frederick T. Jung, M.D., Harold P. Muller, M.D., and Allan J. Ryan, M.D. From the A. A. H. P. E. and R.: Laurence E. Morehouse, Ph.D., M. Gladys Scott, Ph.D., and Arthur H. Steinhaus, Ph.D. Fred V. Hein, Ph.D., was the editor. Consultants to the Committee were W. W. Bauer, M.D., F. A. Hellebrandt, M.D., Ernst Jokl, M.D., and Eleanor Metheny, Ph.D.

This report constitutes a revision of an earlier, similar statement published simultaneously in the *Journal of Health—Physical Education—Recreation* and in *Hygeia Magazine* (now *Today's Health*). The Committee and Consultants responsible for the earlier statement were Arthur H. Steinhaus, Ph.D., Chairman, W. W. Bauer, M.D., F. A. Hellebrandt, M.D., Leon Kranz, and Alice Miller; consultants, Henry A. Christian, M.D., John M. Coulter, M.D., Andrew C. Ivy, M.D., Ernst Jokl, M.D., and Peter J. Steincrohn, M.D.

to continuing exercise. While some athletes never recognize this physiological adjustment, they nevertheless become capable of more closely approaching their physiological limits in activity. This shift in limitations is generally regarded as one of the most important concomitants of training.

A distinction should be made, however, between healthful fatigue and harmful exhaustion. Exercise regularly carried to a point approaching physiological limits results in the development of increased endurance. Exercise carried to the stage of exhaustion may do harm, particularly in the unconditioned individual, and especially if this is frequently repeated with an insufficient time for recovery.

The voluntary muscles increase in size and grow stronger when gradually increasing loads are placed on them to the point where a major proportion of voluntary pulling power is involved. Activities of climbing, lifting, pulling, pushing, jumping, and speed running tend to increase muscular volume and strength.

In a sedentary existence, or where physical activity is not diversified, certain body muscles may not develop sufficiently. Various forms of prescribed activities are used in training programs to overcome this. These usually take the form of selected conditioning exercises, including calisthenics. Under intelligent direction, groups of muscles not much used in the limited activities of modern living or in specialized sport programs may be singled out for development.

Muscular strength increases throughout childhood and through adolescence, usually reaching a maximum in early adulthood (earlier in women than in men). In the 30's or 40's most individuals experience the onset of a gradual decline of strength. The heart and circulatory system also exhibit loss of functional capacity and resilience in recovery after exercise. The extent and rapidity of this decline is at least partly dependent on exercise habits in adult life. Persons who continue to train retain their capacities longer than otherwise. However, great individual differences are encountered dependent on constitutional disposition as well as exercise and other living habits. A few practical generalizations relating to the physiology of exercise seem warranted:

1. A child or youth requires more exercise than an adult because of growth needs. Also, the child's interests tend toward motor acts.

2. If the individual has been active throughout childhood and youth, maximum fitness is achieved earlier, and, in adulthood, decline of fitness is postponed.

3. Age, in itself, is not a contraindication to exercise. Precluding accidents, a healthy person will not do himself permanent organic injury by rational physical activity.

4. Among older persons (over 40) physical examinations and observation of individuals' reactions to exercise disclose large numbers for whom exercise needs to be especially selected.

5. The range of individual variation in capacity for exercise is considerable. Some persons, even at an early age, recover poorly from breathlessness, general fatigue, or feelings of exhaustion. In some, unfavorable emotional reactions are also noted. Attempts to modify these responses through planned exercise should proceed slowly under medical supervision. Such persons frequently cannot reach the levels of fitness achieved by those to whom exercise is an exhilarant and a stimulant.

Safeguards

When averages are considered, there are measurable differences between the sexes in heart capacity, muscular strength, and skeletal proportions. These differences set certain limitations for women in activities of strength, speed, and endurance. However, with the possible exception of heavy lifting or other activities involving greatly increased intra-abdominal pressure, women will profit from most forms of exercise.

In the planning of exercise programs for groups, activities selected for girls and women may well be less strenuous than those selected for men. The range of physical capacities in individuals of both sexes is great, however, with some women having more and some men having less than the average strength, speed, and endurance for their sex. In the case of the individual, therefore, sex is often less significant than constitutional differences, personal inclination, physical condition, and social custom in determining the appropriateness of specific activities.

Exercise has been shown to be beneficial in alleviating certain functional menstrual disorders. General exercise seems to be as beneficial as exercises specifically for abdominal muscles. Whether exercise is continued as usual should depend on the individual's menstrual experience and reaction to physical activity. Some women need not modify their exercise schedule at all, while others may find it desirable to reduce it. If there is reason for doubt, a physician should be consulted.

Certain exercises and activities are more appropriate to certain seasons of the year and certain climates. In general, however, the time of day for exercise may well be in accord with personal inclination, hours of leisure, and other determining circumstances. Evidence as to the effect of exercise on digestion indicates that physical exertion does not necessarily interfere with the digestive process, although strong emotion may do so even unaccompanied by exercise. Laborers and farmers customarily work hard immediately after meals. On the other hand, it has been found advisable for athletes to eat their pregame meal three or four hours prior to competition in activities involving emotional stress.

Exercise Suggestions

The following suggestions will be found useful in deriving the maximum of enjoyment and benefit from exercise:

1. All persons should be shown by medical examination to be organically sound before performing training routines leading to competitive or other strenuous exercise. The medical examination should be repeated periodically or whenever special indications appear.

2. A program of exercise started at an early age may be continued throughout life with certain adjustments in terms of the varying individual effects of the aging process.

3. An individual in good physical condition and training may appropriately participate in an activity that might be harmful to another person of the same age not in a comparable state of fitness.

4. Hard, fast, sustained, or highly competitive games and sports should not be played by persons beyond the age of 30 unless they have maintained or can attain by systematic training an appropriate state of fitness.

5. Persons who are out of training should not attempt to keep pace in any vigorous sport with persons who are properly conditioned and accustomed to regular participation in that sport. Being in condition for one sport does not always mean being in condition for another.

6. Persons should not compete in body-contact sports or endurance activities with others of disproportionate size or skill. Practice periods against such odds may occasionally be warranted as a learning device to gain experience or improve performance.

7. Persons long out of training, or "soft" (who have not practiced strenuous exercise regularly) will need an extended period of conditioning to facilitate gradual return to full activity.

8. The ability to recuperate after physical activity is a good guide to the desirable severity of exercise at any age. Recuperation should be reasonably prompt. If breathlessness and pounding of the heart are still noticeable 10 minutes after exercise, if marked weakness or fatigue persists after a two-hour rest period, if a broken night's sleep is attributable to exercise, or if there is a sense of definite and undue fatigue the day following, then the exercise has been too severe or too prolonged for that person in his present stage of training and physical strength.

9. Exercise, regardless of its nature or extent, cannot provide immunization against infectious illness, nor can it cure communicable disease. Medical determination of the amount and type of any exercise deemed desirable during convalescence is essential.

10. Sports involving body contact or traumatic hazards necessitate the provision of protective equipment. Such protection is especially important for the head. Other activities should be substituted for those in which adequate protection cannot be provided.

11. Boxing is a controversial activity because of the problem of brain injury from blows to the head. The controversy hinges on whether by proper equipment and right regulation participants can be given protection against brain injury comparable to that provided in other sports.

12. Careful preparation and maintenance of playing fields and other arenas of sports is essential to reduction of injuries and full enjoyment of the activity. Adequate facilities and proper equipment are necessary for the same reason.

Summary

Exercise is one of the important factors contributing to total fitness. The contributions of exercise to fitness include the development and maintenance of strength, speed, agility, endurance, and skill in persons who are physiologically sound. Active games, sports, swimming, rhythmic activities, prescribed exercises, and such vigorous hobbies as gardening and other work around the home all can make distinctive as well as worthwhile general contributions to fitness.

Individuals differ in their capacity to enjoy and benefit from participation in exercise, because of constitutional variations in body size, strength, and structure as well as differences in previous experience and present condition. Exercise should be graded according to age, individual reaction to activity, and the state of the person's fitness. After age 40, more frequent medical evaluation of the individual's capacity for exercise is imperative. Activities for girls and women should be selected with regard for their psychological as well as physiological characteristics. Those which involve a minimum of body contact and do not stress heavy lifting should be favored. Regularity of exercise should be stressed with activity continued, if it is well tolerated, during the menstrual period.

The training involved in preparation for athletic competition contributes as much to fitness as participation in the contests themselves. Systematic training for any activity contributes effectively to fitness. Time and care taken to condition the body for sports and athletics through appropriate activities will improve enjoyment, upgrade performance, and increase the ability to continue participation over a period of years.

Certain types of exercise are appropriate to certain conditions of weather and climate. Common sense suggests that a person should not set excessive performance goals under unfavorable conditions. The proper use of protective equipment is essential to safe and effective participation in certain sports. Careful maintenance and proper control of facilities for athletic and other types of participation will help to prevent accidents and reduce injuries. The rules of the game or specifications for play in an activity are made to protect participants and to enhance enjoyment. They should be properly interpreted, scrupulously observed, and vigorously enforced. The vigor with which an individual participates in an activity will have more to do with outcomes for fitness than the activities or events in which he elects to participate.

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STATEMENT BY DR. BLASINGAME TO CHAIRMAN OF SUBCOMMITTEE NUMBER 2 OF THE COMMITTEE ON ARMED SERVICES

The American Medical Association has been following carefully the proposed changes in the pay scales for members of the military services, and is especially concerned with the proposed changes in the provision of the Medical and Dental Officer Career Incentive Act of 1956, Public Law 497. As your Committee is presently engaged in hearings on H. R. 9979, 85th Congress, a bill to change the method of computing base pay for members of the uniformed services, I am taking this opportunity to provide you with the action of our House of Delegates taken in December, 1957, on the subject, and also to re-affirm our position of support for the Career Incentive Act.

The medical officer career incentive bill had the wholehearted support of the American Medical Association. We believed then, as we do now, that it is a valuable method of preserving and improving the quality of military medical manpower. This legislation authorized step-up salary increases for military medical officers, with the raises so spaced as to appeal to seasoned officers, many of whom were leaving military careers for the private practice of medicine. Our great concern is that the progress made since 1956 will be lost if the relative benefits provided under the Career Incentive Act are eliminated in the proposed legislation. We have observed the results of the Career Incentive Act with satisfaction. The increase in special pay has had the effect of slowing down the resignation rate of regular medical officers of the armed forces, of increasing the procurement of new officers, and of providing stability to the respective medical corps. In time under this program the desired goal of a stable career corps, supplemented by younger reserve physicians serving for a shorter period of time, should be reached.

Some factors in the pending pay revisions offer cause for serious concern. Without commenting on the need for an over-all increased pay for the armed services, such as has been proposed under the Cordiner and Department of Defense plan, we believe that the proposed reduction in special pay by as much as $100 or $150 monthly in the groups of the most experienced physicians appears unwise. It certainly seems to be premature in that it would drastically change a law less than two years old. It is realized that, under the proposal, no reduction in pay is to result for any medical officer and that some additional raises will result. However, the reduction in special pay schedules, with a reduction in the amount for the more experienced medical officers, cannot help but have an adverse effect. Even at present rates, the special pay is largely an "earnings equalization pay" to compensate for the long and expensive medical education and the resultant delay in earnings for the physician. It provides little incentive to meet the competition of civilian professional opportunities, such as family stability, economic advantages for the successful physician in private practice, and professional satisfactions which are generally preferred by the majority of physicians to those of a military career.

The Career Incentive Act, passed only two years ago, appears to be doing the job it was intended to do. Figures provided to our Committee on Military Affairs of the Council on National Defense in October, 1957, show that resignations have declined to a significant degree, particularly among the medical officers who have had a number of years of service. Also, there is a rising interest in military medical careers, a trend that will strengthen the medical corps in the years ahead. However, since it is much too early to evaluate the long-term trend, we would recommend caution concerning any changes that might jeopardize the good which has already been accomplished. It is sincerely urged that the Congress retain the special pay in the amount provided in the Medical Officer Career Incentive Act and that this special pay continue to be an addition to the pay provided other officers of appropriate rank and service.

*The following recommendation is an extract from the Reports on Actions of the House of Delegates. This recommendation was adopted by the House of Delegates on Dec. 5, 1957.—*ED.

Report of the Reference Committee on Medical Military Affairs

Mr. Speaker and members of the House of Delegates:

Your Reference Committee is in accord with the Cordiner study committee report which deals with the development of a program to attract and retain the combat leadership, scientific, professional, technical, and management skills required by our armed forces today and in the future, provided it does not impair the effectiveness of the present career incentive provisions now authorized under the Career Incentive Program.

This program has already proved of great benefit in atracting and retaining medical officers in the armed services.

Mr. Speaker, I move the adoption of this portion of the report.

NEW A. M. A. PUBLICATIONS

The ninth annual publication of "Reviews of Medical Motion Pictures" is now available on request from the film library of the A. M. A. This publication is prepared by the Council on Scientific Assembly, Motion Pictures and Medical Television, and contains reprints of all film reviews published in THE JOURNAL during 1957.

A. M. A. in Action.—An attractively illustrated 44-page booklet describes the activities and services of the A. M. A. Single copies free on request from the Public Relations Department.

COUNCIL ON NATIONAL DEFENSE

RESULTS OF SURVEY OF PHYSICIANS SEPARATED FROM ACTIVE MILITARY SERVICE

Since 1952, the Council on National Defense has conducted an opinion survey among physicians being released from active military service. The questionnaire utilized in the survey is primarily designed to obtain pertinent data based upon the physician's observations and opinions, while in the armed forces, concerning the utilization of physicians and the medical staffing conditions in the uniformed services.

The results of this continuing survey are periodically reported in THE JOURNAL. The questionnaire also calls for comments and suggestions of ways to further improve the medical corps as well as ways and means whereby organized medicine can be of greater assistance to military physicians. Consequently, the results of the survey serve as a basis for recommendations and conferences with representatives of the military establishments.

TABLE 1.—*Age Distribution of Physicians by Five-Year Age Groups*

Age	Army	Navy	Air Force
25-29	154	214	216
30-34	276	232	136
35-39	124	136	24
40-44	30	25	5
45-49	10	2	1
50-54	3	...	1
55-59	...	1	...
60-64	3	2	...
65-69	...	2	...
Total	600	614	383

This report covers the period from Jan. 1, 1956, to Dec. 31, 1956. During that period, the Council sent out 2,519 questionnaire forms and, of these, 1,600 completed ones were returned, representing a 64% response.

The order of presentation has been varied somewhat from that of previous years in that more information in both narrative and table form is furnished for the year 1956. Accordingly, table numbers for 1956 will not correspond to those of previous years.

The age distribution of responding physicians in the Army, Navy, and Air Force is disclosed in table 1.

Number of Years Since Graduation

More than half of the physicians replying were graduated from medical school subsequent to 1949; the second largest group graduated during the period 1945-1949. None failed to indicate the year of graduation from medical school. Table 2 discloses the complete tabulation.

Years of Residency Training

The largest group replying to this question had no residency training, while the second largest group had but one year residency training at the time of entrance on active duty. A complete breakdown is given in table 3.

Occupation at Time of Entering Service

The largest groups of physicians who served in the Army and Navy were engaged in general practice at time of entrance on active military duty,

TABLE 2.—*Number and Percentage Distribution of Physicians Graduated from Medical Schools in Selected Intervals*

Interval	No.	%
Before 1940	23	1.4
1940-1944	171	10.7
1945-1949	578	36.1
1950 and later	828	51.8
Total	1,600	100.0

TABLE 3.—*Percentage Distribution of Total Physicians by Years of Residency*

Years	No.	%
None	410	25.6
1	308	19.3*
2	223	13.9
3	277	17.3
4	159	10.0*
Other	223	13.9
Total	1,600	100.0

* Forced to total 100%.

TABLE 4.—*Percentage Distribution of Physicians According to Type of Practice at Time of Entering Military Service*

	Army, %	Navy, %	Air Force, %
Internship	16.2	15.8	35.9
Residency	19.6	21.0	11.5
General practice	24.4	26.6*	28.8
Specialty practice	24.2	26.2	13.6
Other	15.6	10.4	10.2
Total	100.0	100.0	100.0

* Forced to total 100%.

while the largest group in the Air Force was in internship. The summary report for the year 1955 reflected that the largest groups in the Army and Air Force were engaged in general practice, while the largest group in the Navy was in residency training prior to active military service. In the Army and Navy groups specialty practice was second, while in the Air Force general practice was second. Table 4 indicates the percentage distribution by services according to type of practice at time of entering military service.

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Number of Physicians Holding Board Certificates by Field of Specialization

Table 5 shows the detailed numbers, by specialty and branch of services, of physicians holding board certificates. Of the 293 persons responding

TABLE 5.—*Number of Physicians Holding Board Certificates by Field of Specialization*

	Army	Navy	Air Force
Pediatrics	15	22	8
Psychiatry and neurology	6	12	2
Orthopedic surgery	3	2	...
Dermatology and syphilology	3	1	...
Radiology	13	15	2
Urology	3	2	2
Obstetrics and gynecology	7	3	1
Internal medicine	38	28	6
Ophthalmology	3	4	1
Pathology	13	5	6
Otolaryngology	2	3	1
Surgery	34	21	7
Anesthesiology	6	2	...
Plastic surgery	...	...	...
Neurological surgery	1	4	...
Physical medicine	...	...	...
Preventive medicine and public health	2	...	...
Proctology	...	...	...
Thoracic surgery	1	2	1
Other	3	3	...
Total	131	125	37

to the question, 131 holding board certificates were in the Army, 125 were in the Navy, and 37 were in the Air Force. The specialties covered over 19 different fields, of which the largest was internal medicine, the second largest was surgery, and the third largest was pediatrics. In the previous report for the year 1955 internal medicine was first followed by pediatrics and surgery. By branch of service, a total of 22% of those responding in the Army, 20% of those in the Navy, and 10% of those in the Air Force had board certificates.

Government Medical Education Received

Of the 1,600 physicians responding, a total of 533 stated that they had received assistance from the government in their medical education. There were 1,067 who indicated they had received no government assistance. The largest single group receiving government assistance was under the Army Specialized Training Program. The next two largest groups were under the Navy V-12 Program and the GI Program. Table 6 shows the percentages by branch of service. Of the responding physicians, 64% of those who served in the Army, 67.3% of those in the Navy, and 70% of those in the Air Force received no government assistance.

TABLE 6.—*Percentage Distribution of Physicians by Type of Governmental Medical Education Received*

	Army, %	Navy, %	Air Force, %
Army Specialized Training Program	50.9	31.8	20.0
Navy V-12	14.4	31.8	13.9
GI Bill	17.1	13.9	11.3
ASTP and GI Bill	7.9	5.0	6.1
Navy V-12 and GI Bill	2.2	8.5	6.1
Other	7.4	9.0	42.6
Total	100.0	100.0	100.0

Training Received While in Service

There were 895 of a total of 1,597 responding physicians who received military medical training while on active duty in the Army, Navy, and Air Force. The Medical Field Service School accounted for the largest number, with the School of Aviation Medicine the second largest group. Table 7 sets forth the number and percentage distribution of physicians by type of training received in each branch of service.

TABLE 7.—*Number and Percentage Distribution of Physicians by Type of Governmental Medical Training Received*

	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
Basic course, medical field service school	490	81.7	46	7.5	80	23.5
Advanced courses, medical field service school	5	0.8	0	0.0	1	0.3
School of aviation medicine	0	0.0	26	4.2	130	32.9
Marine medical officers training	0	0.0	24	3.9	0	0.0
Marine field service training	0	0.0	8	1.3	0	0.0
Amphibious forces training school	0	0.0	39	6.4	0	0.0
Other schools	5	0.8	21	3.4	10	2.6
None of the above	100	16.7	450	73.3	152	39.7
Total	600	100.0	614	100.0	383	100.0

Physicians' Evaluation of Medical Military Training

The majority of physicians filling out the questionnaire felt that all important features of medical military training had been satisfactorily covered. A small percentage indicated the training was unsatisfactory but gave no specific reasons. Others stated reasons why they considered their tour of service unsatisfactory. According to services, the response to this multiple-answer question was 600 from the Army, 614 from the Navy, and 383 from the Air Force. Table 8 shows percentages by branch of service.

TABLE 8.—*Physicians' Evaluation of Medical Military Training*

	Army, %	Navy, %	Air Force, %
Satisfactory	81.5	66.6	84.6
Unsatisfactory	18.5	33.4	15.4
Unsatisfactory and insufficient training in			
Basic orientation and indoctrination	22.9	51.3	29.7
Military customs, administration, regulations, etc.	46.7	27.0	35.9
Military medicine and surgery	23.8	15.5	28.1
Miscellaneous	6.6	6.2	6.3*
	100.0	100.0	100.0
Total	100.0	100.0	100.0

* Forced to total 100%.

Physicians' Evaluation of Assignment

The majority of responding physicians stated that their longest and next longest assignments were almost completely, or partially but satisfactorily, in line with their training and experience. Consistent

with this evaluation, the majority also expressed satisfaction with the same assignments. In answer to both questions, a greater portion of the Air Force physicians responded favorably than did Army or Navy medical officers. Tables 9 and 10 disclose the percentages by branch of service.

TABLE 9.—*Relation of Assignments in the Service to Training and Experience*

Questions and Replies	Army, %	Navy, %	Air Force, %
Was longest assignment in line with training and experience?			
Almost completely	66.7	54.7*	67.3
Partially, but satisfactorily	13.1	17.9	19.8
Partially, not satisfactorily	13.0*	13.8	8.4
No, hardly at all	7.2	11.6	4.5
Total	100.0	100.0	100.0
Was next longest assignment in line with training and experience			
Almost completely	51.1	51.4	60.7
Partially, but satisfactorily	20.4	24.0	17.4
Partially, not satisfactorily	13.9	12.2*	11.6
No, hardly at all	14.6	12.4	10.3
Total	100.0	100.0	100.0

* Forced to total 100%.

TABLE 10.—*Physicians' Satisfaction With Assignment*

Assignment and Response	Army, %	Navy, %	Air Force, %
Longest assignment			
Very satisfied	52.6	40.5	41.2
Fairly satisfied	26.7	32.0	43.7
Dissatisfied	12.8	15.5*	10.8
Very dissatisfied	7.9	12.0	4.2
Total	100.0	100.0	100.0
Next longest assignment			
Very satisfied	39.9	45.6	46.9
Fairly satisfied	34.6	32.3	32.2
Dissatisfied	14.9	12.7*	14.7*
Very dissatisfied	10.4	9.4	5.4
Other	0.2*	...	0.8
Total	100.0	100.0	100.0

* Forced to total 100%.

Types of Patients Treated

One of the questions was designed to determine the percentage of time devoted by physicians to military personnel, dependents of military personnel, and administrative duties, both at domestic and overseas stations. Table 11 sets forth the percentages.

TABLE 11.—*Percentage of Time Spent in Treating Military Personnel, Dependents of Military Personnel, and Others*

Persons Treated	75-100%	50-75%	About 50%	25-50%	Under 25%	No Response
Military personnel						
Domestic	20.4	13.2	13.0	14.1	19.1	20.2
Overseas	18.9	5.2	5.4	6.3	6.3	57.9
Dependents of military personnel						
Domestic	17.9	8.8	11.9	17.0	24.3	20.1
Overseas	3.9	3.4	4.6	6.5	10.1	71.5
All other duties						
Domestic	8.6	1.4	2.0	6.2	29.5	52.3
Overseas	2.9	1.3	1.9	3.9	15.6	74.4

Types of Nonmilitary Medical Care Provided

The question which was designed to determine the types of medical duties most frequently performed for nonmilitary persons elicited the information that in all three branches of the service outpatient care ranked first at domestic and overseas stations. In the Army, general medical and hospital care was second in the United States, while pediatrics was second at overseas stations. In the Navy, pediatrics was second at domestic installations, while general medical and hospital care was second overseas. Obstetrics and gynecology was second for Air Force physicians in the United States, and pediatrics was second at overseas bases. Table 12 reveals the types of services rendered and with what frequency.

TABLE 12.—*Type of Service Provided to Dependents of Military Personnel*

Type of Service	Army, %	Navy, %	Air Force, %
Domestic			
Outpatient care	30.1	38.1	28.9
Surgery	11.2	11.8	11.6
General medical and hospital care	13.2	12.6	14.8*
Obstetrics and gynecology	10.9	12.4	15.9
Pediatrics	11.4	15.3	15.3
Other	23.2	11.8	13.5
Total	100.0	100.0	100.0
Overseas			
Outpatient care	21.5	10.9	17.9
Surgery	6.9	4.0	6.4
General medical and hospital care	7.1	6.7	7.7
Obstetrics and gynecology	6.9	4.4	7.5
Pediatrics	7.5	5.6	8.7*
Other	50.1	68.4	51.8
Total	100.0	100.0	100.0

* Forced to total 100%.

Medical Care of Dependents of Military Personnel Which Could Have Been Adequately Performed by Civilian Medical Personnel

With respect to service in the United States, the majority of responding physicians were of the opinion that all medical care of nonmilitary persons could have been adequately performed by civilian medical personnel. In the three branches of the service, 816 of 1,316 physicians, or 62%, so responded. However, in regard to overseas service only 127 of 495 physicians, or 26%, were of that opinion. In fact, 197 of 495 physicians, or nearly 40%, stated that none of the medical care of nonmilitary persons at overseas stations could have been adequately performed by civilian medical personnel. Table 13 shows the percentages of physicians in the Army,

TABLE 13.—*Physicians Indicating Feasibility of Medical Care of Nonmilitary Personnel by Civilian Medical Personnel*

Type of Service	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
Domestic						
All care	263	58.8	343	62.2	210	66.0
Most care	86	19.3*	121	22.0	76	23.9
Some care	80	17.9	77	14.0	29	9.1
None	18	4.0	10	1.8	3	1.0
Total	447	100.0	551	100.0	318	100.0
Overseas						
All care	58	23.7	34	27.9	35	27.4*
Most care	33	13.5	13	10.6*	17	13.3
Some care	64	26.1	14	11.5	30	23.4
None	90	36.7	61	50.0	46	35.9
Total	245	100.0	122	100.0	128	100.0

* Forced to total 100%.

Navy, and Air Force and their opinion in regard to the feasibility of the treatment of dependents of military personnel by civilian medical personnel at both domestic and overseas bases.

Physicians' Evaluation of Staffing Conditions

One of the questions was designed to obtain the opinion of physicians as to staffing conditions of nurses, enlisted medical personnel, physicians, dentists, and others at the two units where the physician served his longest and next longest assignments. With respect to the longest assignment, the tabulation of this multiple-answer question indicated that in the Army replies of overstaffing totaled 691, understaffing 823, and adequate staffing 1,470. In the

TABLE 14.—*Medical Staffing Conditions in the Armed Forces*

For longest assignment	Nurses, %	Enlisted Medical Personnel, %	Physicians, %	Dentists, %	Others, %	Total, %
Army						
Overstaffed	5.1	11.1	16.0	15.6	52.0	23.1
Understaffed	32.6	15.6	29.0	16.5	38.6	27.6
Adequate	62.3	73.3	55.0	67.9	9.4	49.3
Total	100.0	100.0	100.0	100.0	100.0	100.0
Navy						
Overstaffed	4.5	12.9	27.6	12.9	51.6	24.9
Understaffed	30.8	26.3	21.4	15.5	36.2	27.4
Adequate	64.7*	60.8	51.0	71.6	10.2	47.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
Air Force						
Overstaffed	5.2	13.0	17.2	23.1	54.6	24.1
Understaffed	49.6	36.0	31.7	17.2*	31.3	33.2
Adequate	45.2	51.0*	51.1	59.7	14.1	42.7
Total	100.0	100.0	100.0	100.0	100.0	100.0
For next longest assignment						
Army						
Overstaffed	4.3	13.5	30.2	14.1	39.9	26.4
Understaffed	36.2	11.2	23.5	13.1	36.9	27.5
Adequate	69.5	75.3	56.3	72.8	23.2	46.1
Total	100.0	100.0	100.0	100.0	100.0	100.0
Navy						
Overstaffed	5.8	15.8	23.3	10.3	40.2	26.4
Understaffed	17.9	14.8	18.9	13.5	38.3	26.6
Adequate	76.3	69.4	57.8	76.2	21.5	47.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Air Force						
Overstaffed	6.1	11.1	15.2	13.7	39.8	25.9
Understaffed	34.3	21.2	24.0	16.5	34.8	29.6
Adequate	59.6	67.7	60.8	69.8	25.4	44.5
Total	100.0	100.0	100.0	100.0	100.0	100.0

* Forced to total 100%.

Navy, overstaffing totaled 738, understaffing 811, and adequate staffing 1,415. The Air Force tabulation revealed 461 replies of overstaffing, 636 of understaffing, and 819 of adequate staffing. The response to the question concerning the next longest assignment revealed that in the Army overstaffing totaled 671, understaffing 701, and adequate staffing, 1,174. In the Navy, the results were 697, 702, and 1,243 respectively, while the Air Force tabulation was 414, 473, and 710 respectively. Table 14 reflects, in detail, the percentages relative to overstaffing, understaffing, and adequate staffing conditions in the three military services for the physicians longest and next longest assignments.

Unnecessary or Wasted Aspects of Military Training

There were 477 physicians who responded affirmatively to the question, "Were there any aspects of your military training that were unnecessary or

TABLE 15.—*Unnecessary or Wasted Aspects of Military Training*

	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
Not in field for which trained	9	4.6	8	4.4	2	1.8
No training or experience in field	5	2.6	6	3.3	2	1.8
Capable of more responsible medical duties	22	11.2	62	34.1	13	11.3
Nonmedical duties	144	73.5	67	36.8	84	73.0
Miscellaneous	13	6.6	28	15.4	10	8.7
No reason given	3	1.5	11	6.0	4	3.4
Total	196	100.0	182	100.0	115	100.0

wasted?" Negative answers were received from 1,120 medical officers. Of those who answered affirmatively, the majority were of the opinion that performance of nonmedical duties was the area of greatest waste in their military training. Table 15 sets forth the reasons with percentages.

Physicians' Suggestions for Making Military Service More Attractive to Medical Men

There were 1,476 physicians who offered suggestions for making military service more attractive for the practice of medicine. Only 124 physicians felt that nothing could be done to make military service more attractive to medical men. Table 16 sets forth the suggestions from physicians in the three branches of military service.

Suggestions for Improvement of Services Furnished by Medical Associations to Military Physicians

A total of 515 physicians, or 32%, offered suggestions in response to the question concerning the role of national and local medical associations in main-

TABLE 16.—*Physicians' Suggestions for Making Military Service More Attractive to Medical Men*

Suggestions	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
Improved utilization of medical personnel	376	19.4	440	21.4	224	17.2
Higher rank; merit promotions	149	7.7	121	5.9	84	6.4
Increase in pay	268	13.8	241	11.7	204	15.6
Choice of stable location	107	5.5	150	7.3	83	6.4
Adequate housing for family	101	5.2	82	4.0	59	4.5
Opportunity to practice specialty	83	4.3	96	4.7	40	3.1
Residency or further training	72	3.7	64	3.1	60	4.6
More capable commanding officers	92	4.7	138	6.7	105	8.0
Freedom from nonmilitary interference	102	5.2	96	4.7	75	5.8*
Independent medical service without rank	142	7.3	134	6.0	103	7.9
Other	450	23.2	502	24.5*	368	20.5
Total	1,942	100.0	2,054	100.0	1,305	100.0

* Forced to total 100%.

taining closer contact or rendering better service to their members who served as physicians in the armed forces. The suggestions are tabulated in table 17. The other 1,082 physicians who returned the questionnaire offered no suggestions.

Physicians Who Would Voluntarily Remain in Service

In response to the question relative to military service beyond the obligated tour of duty, 929 physicians indicated they would not be willing to stay in military service for more than two years of service under any conditions except total war. There were 671 physicians who indicated they would serve an additional period under certain conditions. Many physicians listed more than one condition. Table 18 reflects the reasons or conditions under which an additional period of service would be acceptable.

TABLE 17.—*Suggestions for Improvement of Services Furnished by Medical Association to Military Physicians*

Suggested Society Activities	Army	Navy	Air Force
More information, newsletters, etc.	49	30	16
Personal visits by civilian physicians to evaluate grievances	85	77	56
Invitation of military physicians to civilian medical meetings	32	30	32
Assistance in locating a position after discharge	8	16	3
Assistance in preventing evasion of military service	4	6	2
Distribution of questionnaires to physicians in service	26	22	18
Provision of specialists for clinical conferences	17	18	10
Miscellaneous suggestions	23	25	20
Total	244	220	157

TABLE 18.—*Distribution Indicating Conditions of Voluntary Extension of Service Beyond Two Year Requirement*

Conditions	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
Demonstrated need	28	4.7	15	2.3	8	1.8
All doctors serving on an equitable basis	16	2.7	10	1.5	7	1.5
Promotion to higher rank	31	5.3	30	4.6	30	6.6
Increase in pay	71	12.0	62	9.5	69	15.1
Given residency or further training	34	5.8	41	6.3	30	6.6
Opportunity to practice specialty	37	6.3	57	8.7	34	7.4
Choice of duty assignment	33	5.6	59	9.0	40	8.8
Choice of stable location	48	8.1	62	9.5	39	8.5
Living quarters for family	26	4.4	18	2.7	12	2.6
Request for extension at status quo refused	2	.3	3	.4	2	.4
Extended service time voluntary	18	3.1	29	4.4	20	4.4
Miscellaneous conditions	246	41.7	269	41.1	166	36.3
Total	590	100.0	655	100.0	457	100.0

Preferred Branch of Service for Practice of Medicine

In response to the question of preference if the physician were going to practice medicine in a federal government agency, 608 physicians stated a preference for the armed forces. A total of 971 physicians expressed a preference for other agencies of the federal government, while 18 physicians had no preference. Of those who preferred the armed forces, the majority chose the branch of service in which they had served. Table 19 sets forth the preferences as to branch of service.

Distribution of Physicians by Rank at Time of Discharge

The majority of physicians in the Army and Air Force held the rank of captain at the time of their release from active military duty. However, in the Navy at the time of separation, the majority were in the lowest rank of lieutenant junior grade. There were 1,597 physicians who answered this question. The survey indicated that approximately 36% of those who reported were in the lowest rank, while 44% held the rank of captain or lieutenant senior grade. There were approximately 20% with the rank of major or lieutenant commander and higher. Table 20 indicates the number and percentages by rank within the three services.

Length of Active Service as a Medical Officer

In the Army there were 600 responding physicians who served an average of 15½ months in the United States and 9 months at overseas stations. There were 614 naval medical officers who had an average of 20 months active duty in the United States and 5 months overseas. Responses from 383 physicians in the Air Force revealed an average tour of duty of 21 months in the United States and 6 months at overseas bases.

TABLE 19.—*Preferred Branch of Service for Practice of Medicine*

	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
Army	152	74.5	5	2.1	5	3.0
Navy	3	1.5	218	92.4	2	1.2
Air Force	47	23.0	12	5.1	161	95.8
Other	2	1.0	1	.4	...	...
Total	204	100.0	236	100.0	168	100.0

TABLE 20.—*Distribution of Physicians by Rank at Time of Discharge*

	Army		Navy		Air Force	
	No.	%	No.	%	No.	%
1st. lieut.-lieut. j.g.	179	29.8	392	63.9	4	1.0
Capt.-lieut. s.g.	342	57.0	21	3.4	341	89.0
Major-lieut. commander	41	6.8	115	18.7	5	1.3
Lieut. col.-commander	7	1.2	53	8.6	1	0.3
Col.-capt.	...	...	3	0.5	...	...
Other	31	5.2	30	4.9	32	8.4
Total	600	100.0	614	100.0	383	100.0

TABLE 21.—*Percentage Distribution of Physicians According to Reserve Status*

	Army, %	Navy, %	Air Force, %
Retained commission	34.8	68.2	46.5
Resigned commission	64.7	31.8	53.5
No response	0.5	0.0	0.0
Total	100.0	100.0	100.0

Reserve Status

Of the 1,597 physicians reporting, 806 indicated they retained their reserve commissions while 788 resigned their commissions. There were three who did not respond. By services, the Army had 209 retaining commissions and 388 resigning; the Navy had 419 retaining and 195 resigning; and the Air Force had 178 retaining and 205 resigning their commissions. Table 21 reflects the percentages by branch of service.

MEDICAL NEWS

CALIFORNIA

Harvard Alumni Meeting.—There will be a dinner meeting of the Harvard Medical Alumni Association of Southern California on April 23, 6:30 p. m., at the California Club, Los Angeles, and all graduates from Harvard Medical School are invited. Meetings of the California Medical Association and the American College of Obstetricians and Gynecologists will take place during that week in Los Angeles. Reservations can be secured from Dr. Lowell F. Bushnell, 1321 N. Vermont Ave., Los Angeles 27, chairman of the executive committee.

Funds for Cardiovascular Research.—Applications for funds to support research in the cardiovascular field will be received until April 15, by the Los Angeles County Heart Association. Applications will be considered on a priority basis as follows: (1) research into the causes and means of prevention of heart disease; (2) research concerning treatment of heart disease; and (3) studies of methods of diagnosis. Applications are invited for project grants-in-aid, fellowships, and established investigatorships. The committee will consider the applications early in May and will interview each applicant. Grants will be effective July 1. Ten copies of each application must be submitted. Information may be obtained from the Heart Association, 660 S. Western Ave., Los Angeles, DUnkirk 5-4231.

Annual Tuberculosis Meeting.—The annual meeting of the California Tuberculosis and Health Association will be held April 10-12 at the Villa Hotel, San Mateo. Joint and special sessions will be held with the California Trudeau Society, California Sanatorium Association, and California Conference of Tuberculosis Workers. Speaker at the opening joint session will be Dr. Robert H. Ebert, professor of medicine, Western Reserve University, School of Medicine, Cleveland, whose topic is "New Horizons in Research." Other speakers are as follows:

Our Common Problem—Alcoholism, Mrs. Marty Mann, executive director, National Council on Alcoholism.

Radiation and Research, Dr. Robert R. Newell, consultant, Naval Radiological Defense Laboratory, San Francisco.

Program Research Via the Tuberculin Test, Dr. H. Cabot Brown, field director for the association's tuberculin testing team.

Small Associations and Research, Dr. Edna M. Winter, Fresno.

Review of Surgery, Dr. Edgar W. Davis, Georgetown University, Washington, D. C.

A symposium on chemotherapy is planned, and a summary address, "The Real Needs in Pulmonary Research," will be given by Dr. Averill A. Liebow, John Ely Professor of Pathology, Yale University, New Haven, Conn. For information write the California Tuberculosis and Health Association, 130 Hayes St., San Francisco.

COLORADO

Dr. Wasson Receives Radiology Award.—Dr. W. Walter Wasson, Denver radiologist, was awarded the Gold Medal of the American College of Radiology Feb. 7, for his "outstanding contributions to the art and science of this medical specialty." Only 18 other radiological leaders in the nearly 40-year history of the College have been awarded the Gold Medal.

Society News.—Officers of the Colorado Radiological Society for the current year are: president, Dr. James W. Lewis, of Colorado Springs; vice-president, Dr. Emanuel Salzman, of Lakewood; secretary, Dr. Lorenz R. Wurtzebach, 601 E. 19th Ave., Denver; treasurer, Dr. Charles Gaylord, Denver. —The Colorado Society of Clinical Pathologists has elected the following officers for 1957-1958: Dr. William D. Millett, president; Dr. Silas M. P. Ashe, vice-president; Dr. Paul K. Hamilton Jr., secretary-treasurer; and Dr. William C. White, councilor.

CONNECTICUT

John H. Bumstead Memorial Fund.—Creation of a John H. Bumstead Memorial Fund for purchase of publications for the Yale Medical Library has been announced. The fund honors the memory of the late Dr. John H. Bumstead, associate clinical professor of the Yale School of Medicine. Associates of the Yale Medical Library have established the fund, with many of Dr. Bumstead's former medical colleagues, friends, and patients already contributing to the continuing memorial. Books and publications purchased through income of the fund will be identified by a special bookplate which is being designed.

Dr. Southwick to Head Orthopedics Section.—Dr. Wayne O. Southwick, a member of the Johns Hopkins medical faculty, has been appointed associate professor of orthopedic surgery and head of the Section in Orthopedics at the Yale School of Medicine, New Haven, effective July 1. Dr. Southwick joined the Johns Hopkins staff in 1950. He was on

Physicians are invited to send to this department items of news of general interest, for example, those relating to society activities, new hospitals, education, and public health. Programs should be received at least three weeks before the date of meeting.

leave in 1952-1953 for military duty and on returning in 1954 was appointed an instructor in orthopedic surgery. He was promoted to assistant professor in 1957. At Yale he will succeed Dr. Charles O. Bechtol, who resigned to accept an appointment in California.

State Medical Meeting in Stratford.—The 166th annual meeting of the Connecticut State Medical Society will be held in the High School at Stratford, April 29-May 1. Out-of-state speakers will present the following:

Staphylococci and the Use of Antibiotics, Dr. Wesley W. Spink, Minneapolis, Minn.
Spontaneous Regression of Malignancy, Dr. Tilden C. Everson, Chicago.
Some Uses of Isotopes in Medicine, Dr. Solomon A. Berson, Bronx, N. Y.
Thyroid Disease in Children, Dr. Robert W. Buxton, Baltimore.
Rehabilitation of the Patient with Coronary Artery Disease, Dr. Lewis H. Bronstein, New York City.
Reactions Due to Drug Idiosyncracy, Dr. Robert P. McCombs, Boston.
Current Status of Anti-Hypertensive Drugs, Dr. William Hollander, Boston.
Space Medicine, Brig. Gen. Wilford F. Hall, M.C., U.S.A.F., Wright-Patterson Air Force Base, Ohio.
Progress in Cancer Research, Dr. Cornelius P. Rhoads, New York City.

A panel discussion on adoptions will be held the afternoon of April 30. Dr. Aims C. McGuinness, special assistant for health and medical affairs to the Secretary of Health, Education and Welfare, Washington, D. C., will present "The Role of the Federal Government in the Field of Medical Care" at the annual dinner April 30. A film, "The Doctor Defendant," will be shown May 1. For information write the Connecticut State Medical Society, 160 St. Ronan St., New Haven 11, Conn.

ILLINOIS

Chicago

Neurological Society Lecture.—The Leo Kaplan Memorial Lecture will be given before the Chicago Neurological Society April 8 in the Beaubien Room of Stouffer's Restaurant, Prudential Building, Prudential Plaza, at 8 p. m., by Charles M. Pomerat, Ph.D., professor of cytology, University of Texas, School of Medicine, on the subject, "Recent Advances in the Study of Living Nervous Tissue."

Summer Camp for Diabetic Children.—The Summer Camp for Diabetic Children will be conducted for the 10th year under the auspices of the Chicago Diabetes Association from July 20 through Aug. 10 at Holiday Home, Lake Geneva, Wis. Boys and girls from 8 through 14 years of age are eligible. The camp will be staffed by resident physicians, a nurse, two dietitians, and a laboratory technician, in addition to the regular counseling and domestic staff of Holiday Home. Rates for Summer Camp are arranged in accordance with individual circumstances. Applications may be obtained from, and inquiries should be addressed to The Chicago Diabetes Association, 5 S. Wabash Ave., Chicago 3, Phone ANdover 3-1861.

KENTUCKY

County Society Officers Conference.—Speakers at the eighth annual County Society Officers Conference March 27, sponsored by the Kentucky State Medical Association, included the following: Dr. Gunnar Gundersen, LaCrosse, Wis., president-elect, A. M. A.; Dr. Thomas H. Alphin, director of the Washington, D. C., office of the A. M. A.; Mr. Arthur J. Clephane, Philadelphia, attorney for the Pennsylvania State Medical Society; Mr. John Castellucci, Chicago, executive director of the Blue Shield Medical Care Plans; Mr. Oliver Ebel, Topeka, executive secretary of the Kansas State Medical Society; Major General Paul I. Robinson, executive director, Office for Dependents' Medical Care, Department of the Army, Washington, D. C., and Mr. Robert B. Throckmorton, Des Moines, attorney for the Iowa State Medical Society.

MARYLAND

Eliot Infirmary for Retarded Children.—The Martha M. Eliot Infirmary of the District Training School of the Children's Center, Laurel, named to honor Dr. Eliot's years of service to the cause of child and maternal health, was dedicated March 9. The new building, which is designed for the care of severely retarded, helpless children is, as is the center, under the direction of the Department of Public Welfare of the District of Columbia. The Children's Center, of which the infirmary is a part, also embraces an educational program for parents and foster parents of the mentally retarded. The Martha M. Eliot Infirmary was built at a cost of $813,500. It includes space for 200 children. Opportunities will be offered to medical persons working in the new infirmary to develop diagnostic and classification skills. Dr. Eliot, who was guest of honor at the dedication, is head of the department of maternal and child health, Harvard University, Boston.

Personal.—Dr. George W. Sprehn has been appointed director of the Community Psychiatric Clinic of Montgomery County. He succeeds Dr. Henry A. Segal, who resigned last September to enter private practice. Dr. Sprehn has been serving on an interim basis since Nov. 1.—Appointment of Dr. William B. Wood Jr., vice-president in charge of medical institutions, Johns Hopkins University, Baltimore, to the National Advisory Allergy and Infectious Diseases Council was announced Feb. 28 by the Surgeon General, U. S. Public Health

Service. Dr. Wood is a trustee of the Rockefeller Foundation, a member of the Armed Forces Epidemiological Board, and a consultant to the Walter Reed Army Medical Center.

MASSACHUSETTS

University News.—The Alpha Omicron Chapter of the Phi Delta Epsilon Fraternity at the Boston University School of Medicine, will hold its annual Aaron Brown Lecture April 9, 7:30, in the auditorium of Boston University School of Medicine. The guest speaker will be Dr. Dwight Emary Harken, associate professor of surgery, Harvard Medical School. The general topic will be the "Past, Present, and Future of Cardiac Surgery."

Law-Medicine Research Institute.—A Law-Medicine Research Institute has been established at Boston University, president Harold C. Case, LL.D., has announced. The institute, working cooperatively with the university's schools of law and medicine, headed respectively by deans Elwood H. Hettrick, LL.D., and Dr. Chester S. Keefer, will establish a program of research and training in the interdisciplinary areas of law, medicine, and the behavioral sciences. It will also act as a clearing-house for information on activities in the medico-legal area. Named as director of the institute is Prof. William J. Curran, of Newton, a professor of law and legal medicine at the university. Beginning with the present semester, the institute will conduct courses in medico-legal areas and will regularly sponsor a lecture series for the practicing members of the profession. This spring, New York attorney Emile Zola Berman is scheduled to speak. The complete National Advisory Council to the Institute includes among others C. Joseph Stetler, Director, Law Department, American Medical Association.

MICHIGAN

Hospital News.—A new $1,250,000 wing at the Evangelical Deaconess Hospital, Detroit, was dedicated Dec. 15. In commemoration of the opening of the addition Dr. Harry Goldblatt, professor of experimental pathology, Western Reserve University School of Medicine, Cleveland, presented a lecture, "Experimental Cancer," March 15. The new wing has five floors.

Mobile Laboratory for Pollution Testing.—A new mobile laboratory-classroom has started visiting sewage treatment plants throughout the state. The $14,000, custom-built, 32-foot trailer was purchased by the Michigan Water Resources Commission out of federal funds allocated to Michigan for stream pollution abatement. The trailer, operated by state health department chemists and engineers, has two purposes: (1) to evaluate local plant performance by helping local operators to detect and investigate causes of reduced efficiency in the plants; (2) to train plant operators to perform chemical and physical tests. Before July 1 the unit will visit about 25 plants in the southern part of the state and eventually will visit most of the 200 publicly owned sewage treatment plants in Michigan.

Dr. Weber to Give Hodges Lecture.—The Fred Jenner Hodges Radiological Society will present the first Fred Jenner Hodges Lecture April 11, 4:30, in the Rackham Amphitheater, University of Michigan, Ann Arbor. Dr. Harry M. Weber, head, Section of Diagnostic Roentgenology, Mayo Clinic, will speak on "The Roentgenologic Contribution to the Diagnosis of Abnormalities of the Ileocecal Coil."

University News.—The Omega Chapter of the Phi Delta Epsilon Fraternity at the University of Michigan, Ann Arbor, will hold its annual lectureship April 17. The guest speaker will be Dr. Philip Thorek, chairman, department of surgery, University of Illinois, Chicago. The lecture will deal with "intestinal obstruction with special attention directed toward fluid management."

Annual Cancer Day in Flint.—The Genesee County Medical Society will present its 13th annual cancer day program April 9 in Flint. Papers to be read include:

The Role of Angiography in the Diagnosis of Tumors, Dr. Benjamin Felson, Cincinnati.
Radical Pelvic Surgery for Lower Abdominal Cancer, Dr. Eugene M. Bricker, St. Louis.
Primary Cancer of the Lymph Nodes, Dr. Alfred A. Gellhorn, New York City.
Gastric Ulcer and Gastric Cancer, Dr. Isidor S. Ravdin, Philadelphia.
The Pathology of Gastrointestinal Cancer, Dr. Robert C. Horn Jr., Detroit.
Cancer of the Head and Neck, Dr. Edgar L. Frazell, New York City.

For information write the Genesee County Medical Society, 900 Begole St., Flint, Mich.

NEBRASKA

Dr. Alvarez to Give Poynter Lecture.—Dr. Walter C. Alvarez, professor of medicine emeritus of the University of Minnesota, will be the C. W. M. Poynter Lecturer for 1958 at the Poynter dinner at the Town House, Omaha, presented by the University of Nebraska College of Medicine, April 10. Dr. Alvarez, now of Chicago, will also deliver a campus convocation address on the same day. The annual Poynter dinner is a highlight of the Spring Post-Graduate Assembly on "Recent Advances in Clinical Medicine."

NEW JERSEY

Dr. Phillips Honored.—The community of Englewood, N. J., recently honored Dr. Walter Phillips and 800 people turned out to see him get the "Outstanding Citizen" award of 1958. The Englewood lodge of B'nai B'rith in cooperation with 25 local civic organizations honored Dr. Phillips and were generous with tributes. The 78-year-old doctor served as president of his local medical society in 1920 and the Medical Society of New Jersey presented him with its Golden Merit Award in 1957. The minister of the First Presbyterian Church said "no matter what he may have, it is but a small part of what he has given away or neglected to collect."

Personal.—Dr. V. D. Mattia Jr., Nutley, has been appointed director of medical research for Hoffmann–La Roche Inc. Dr. Mattia, formerly director of medical information, succeeds Dr. E. L. Severinghaus, who has retired.——Dr. Earle L. Warren, head, radiology department, Paterson General Hospital, has been elected president of the Greater Paterson Chamber of Commerce, filling the vacancy caused by the resignation of the president. It is the first time in the chamber's 50 year history that a physician has served as president. Dr. Warren has been a member of the chamber's Governmental Affairs Committee for six years.

Dr. Connolly Receives Martland Award.—The Essex County Pathological and Anatomical Society has announced that Dr. Henry A. Connolly Jr. has won the annual Harrison Stanford Martland award competition for 1957. Dr. Connolly, a resident in general practice at the Overlook Hospital in Summit, presented his paper on "Graphic Reconstruction of Diseased Blood Vessels (Applied to a Study of Osler's Disease)" at the annual meeting of the society March 27. The award comprising a gift of $250 and an engrossed scroll is presented each year by the Society as a memorial to Dr. Harrison Stanford Martland, late medical examiner and pathologist to the Martland Medical Center.

NEW YORK

Community Honors Dr. Jolls.—The citizens of Orchard Park, a suburban Buffalo community, held a dinner and meeting March 4 to honor Dr. Willard B. Jolls, 88, who has served as local physician for over six decades. Appointed health officer for the town in 1918, Dr. Jolls has passed four decades in that post, a record in the Erie County Health Service. In 1945 the Erie County Medical Society honored him with their medal for 50 years of medical practice. For almost 25 years he wrote a weekly column, "Timely Health Talks," in the local paper.

Personal.—Dr. Daniel H. Deyoe, of Syracuse, became medical director of the Crouse–Hinds Company Dec. 16.——Dr. Hobart A. Reimann, recently chief of internal medicine at the Binghamton City Hospital, Binghamton, has taken up his duties as chief of internal medicine at the Shiraz Medical Center, Iran. Dr. Reimann has been a member of the faculty of Jefferson Medical College, Philadelphia, Peking University Medical College, China, and a visiting professor at the American University in Beirut.

State Tuberculosis Meeting.—The annual meeting of the New York Tuberculosis and Health Association, will be held April 30 at the Hotel Statler, New York City. Dr. William R. Barclay, assistant professor of medicine, University of Chicago, will present "Tuberculosis Research in the Atomic Age" following the luncheon. Dr. James E. Perkins, managing director, National Tuberculosis Association, will speak on "The 2,000,000 Yesterday, Today and Tomorrow," and Dr. Theodore L. Badger, president, American Trudeau Society, will present "A New Look at an Old Problem—Sex and Tuberculosis." A panel discussion, "The Hunt for the 10,000 Unknowns in New York City," will be moderated by Dr. Berwyn F. Mattison, executive secretary, American Public Health Association. For information write the New York Tuberculosis and Health Association, Inc., 386 Fourth Ave., New York 16.

New York City

Appoint Pharmacology Department Head.—William G. Van Der Kloot, Ph.D., associate professor of zoology, Cornell University, will become chairman of the department of pharmacology at New York University College of Medicine at the close of the academic year (June 1958). Prior to his appointment at Cornell in 1956 he was an instructor in biology at Harvard University, Boston. Dr. Van Der Kloot has been a fellow of the Lalor Foundation and of the National Research Council. He is a member of the American Society of Zoologists, the Society for Experimental Biology, and the Association for the Study of Animal Behaviour.

OHIO

Annual State Meeting in Cincinnati.—The annual meeting of the Ohio State Medical Association will be held April 15-17 at the Netherland Hilton Hotel, Cincinnati. The symposium on Fractures to be presented at the general session April 15, will be moderated by Dr. Edgar C. Baker, Youngstown. The following panel discussions are planned:

Modern Approach to the Problems of Tonsil and Adenoid Surgery, moderated by Dr. Richard H. Stahl, Cuyahoga Falls.

Prevention and Treatment of Abortions; Dr. Arthur G. King, Cincinnati.

Respiratory Distress of the Newborn; Dr. Benjamin H. Landing, Cincinnati.

Diagnosis and Management of Diseases of the Liver and Extrahepatic Biliary System; Dr. Stanley O. Hoerr, Cleveland.

Physical and Psychiatric Aspects of Rehabilitation; Dr. W. Donald Ross, Cincinnati.
Involuntary Movement and Its Surgical Treatment; Dr. Curwood R. Hunter, Cincinnati.

Dr. F. J. L. Blasingame, Chicago, general manager, A. M. A., will present "It's Your AMA" April 16, and Dr. David B. Allman, president, A. M. A., will present an address at the annual banquet, April 16. Scientific and technical exhibits, alumni meetings, and a workshop on medical writing, conducted by Dr. Jonathan Forman, editor *Ohio State Medical Journal*, are planned. For information write the Ohio State Medical Association, 79 E. State St., Room 1005, Columbus 15, Ohio.

OKLAHOMA

Increase in Rabies.—The laboratories at the Oklahoma State Department of Health have released statistics showing 46 animal heads positive in 1957 as compared with 7 heads in 1956 and 5 in 1955. The 1957 figures show 19 dogs, 6 cattle, 1 pig, 5 cats, 12 skunks, 1 bat, 1 mouse, and 1 squirrel as the animals involved. The laboratories examined a total of 749 specimens, 667 of which were negative and 36 of which were unsatisfactory for examination. The 12 skunks with rabies are the first to be reported since 1952, when 5 were reported. The first case of a person being bitten by a rabid bat in the state occurred in June in Enid when an 8-year-old boy was attacked. He was given the complete series of anti-rabies inoculations and recovered. This was the third report of rabid bats in the state, two having been found in 1956 through the joint bat rabies research project carried out by the state laboratories and Oklahoma University under a U. S. Public Health grant.

OREGON

Alumni Association Meeting.—The 43rd annual meeting of the Alumni Association of the University of Oregon Medical School will be held April 16-18 in the Medical School auditorium. Dr. Morton J. Goodman, president of the Association and assistant clinical professor of medicine, has named Dr. Faulkner A. Short, a vice-president of the alumni organization and clinical associate in orthopedic surgery, as program chairman. The following Sommer Memorial Lectures will appear at the spring meeting. Dr. Lowell A. Rantz, professor of medicine, Stanford; Dr. John A. Stallworthy, Oxford, England; and Dr. Alan R. Moritz, professor of pathology, Western Reserve University, Cleveland. The General Practice group will provide category I postgraduate credit for the meeting based on the number of hours of formal lectures. Fraternity reunions will be held the evening of April 15; the Sommer lecture banquet will take place the night of April 16; the Alumni Association annual banquet will be held April 17; and class reunions are scheduled for the evening of April 18.

PENNSYLVANIA

New County Society Building.—The Berks County Medical Society dedicated its new Medical Hall on Oct. 30. Built to replace previous headquarters which were deeded to the society as a gift in 1912, the new building is the result of 10 years of planning by the Building Committee, under the aegis of Dr. Charles K. Kistler. The structure includes a "well-lighted and ventilated meeting room with the most advanced audio-visual equipment," board room, secretary's office, lobby, cloak room, and kitchen. A suite for the Medical–Dental Bureau of Berks County is also provided, complete with a telephone switchboard to accommodate around-the-clock emergency call service. The dedication speaker was Dr. John W. Shirer, president, Pennsylvania State Medical Society.

The new Medical Hall of the Berks County Medical Society.

Philadelphia

University News.—The Mu Chapter of the Phi Delta Epsilon Fraternity at the Jefferson Medical College will hold its annual lectureship April 18, 8:30 p. m., in McClellan Hall. The guest speaker will be Dr. Denton A. Cooley, of the Baylor University School of Medicine, Houston, Texas, who will discuss "Emergencies Arising During Surgery to the Heart and Great Vessels."

TENNESSEE

Dr. Christie to Receive Phillips Award.—Dr. Amos Christie, head, pediatrics department, Vanderbilt University School of Medicine, Nashville, has been selected to receive the John Phillips Memorial Award at the convention of the American College of Physicians in Atlantic City, April 30. The award is named in honor of one of the pioneers in the development of internal medicine as a specialty and one of the founders of the college. Dr. Christie was selected for his research work concerning histoplasmosis. He came to Vanderbilt in 1943, after wartime service as assistant director of the medical and health service of the American Red Cross.

TEXAS

Award for Research in Psoriasis.—The department of dermatology, Baylor University College of Medicine, Houston, Texas, announces that Drs. J. M. Paschoud, von B. Schmidli, and Walter Keller have been selected as recipients of the $1,000 award for research in psoriasis. The award is given for their work published in the *Archiv fur Klinische und Experimentelle Dermatologica* and in *Dermatologica*. This award was established as a 10-year program for research in psoriasis by Carol and Henry J. N. Taub in honor of their grandparents, Mr. and Mrs. J. N. Taub.

WEST VIRGINIA

Surgeons Meet in White Sulphur Springs.—The West Virginia Chapter of the American College of Surgeons will be held at The Greenbrier, White Sulphur Springs, April 18-19, under the presidency of Dr. Charles D. Hershey, of Wheeling. The following papers will be presented by out-of-state speakers:

Pancreatic and Periampullary Tumors, Dr. Kenneth W. Warren, Boston.
Surgical Considerations in Pancreatic Disease, Dr. Warren.
Emphasis on Trauma, Dr. Hubbard P. Saunders, Chicago.
Vagaries of Abdominal Trauma, Dr. Robert J. Coffey, Washington, D. C.
The Prevention and Repair of Surgical Trauma, Dr. Warren.

Members of the state chapter of the American Academy of General Practice are invited. Dr. Kenneth G. MacDonald, of Charleston, is secretary-treasurer of the state chapter of the college.

GENERAL

Urologists Meeting in New Orleans.—The 53rd annual meeting of the American Urological Association, Inc., will be held April 28-May 1 at the Roosevelt Hotel, New Orleans. Over 30 papers are scheduled for presentation, including "Modern Concepts of Urologic Endocrinology," by Dr. Matthew M. Steiner, Chicago.The president's address, "Office Urology," will be given by Dr. William J. Baker, Chicago. Two panel discussions are planned: Determination of Sex and What to Do About It, moderated by Dr. Raymond G. Bunge, Iowa City, and Medicolegal Aspects of Urology, moderated by Dr. Hubert W. Smith, Austin, Texas. The Ramon Guiteras Lecture, "An Evaluation of Cystectomy in Urologic Surgery," will be given by Dr. Charles C. Higgins, Cleveland. For information write Dr. Samuel L. Raines, Secretary, American Urological Association, Inc., 188 S. Bellevue Blvd., Memphis 4, Tenn.

Cancer Research Meeting in Philadelphia.—The 49th annual meeting of the American Association for Cancer Research, Inc., will be held April 11-13 at the Sheraton Hotel, Philadelphia. The presidential address, "A Meeting of Ways in Cancer Research," will be given April 12 by Dr. Jacob Furth, of Boston. A symposium on "Recent Contributions of Tissue Culture to Cancer Research" will be held jointly with members of the Tissue Culture Association and will include the following:

Tissue Culture in Cancer Chemotherapy Screening, Erich Hirschberg, Ph.D., New York City.
Interactions Between Normal and Tumor Cells, Dr. Joseph Leighton, Pittsburgh.
Energy Costs of Growth in Continuous Metozoan Cell Cultures, Samuel Graff, Ph.D., New York City.
Nutritional Growth and Amethopterin-Resistance Characteristics of Leukemic Clones, Glenn A. Fischer, Ph.D., New Haven, Conn.
Clonal Studies on Normal Cells and on Their Neoplastic Transformation in Tissue Culture, Katherine K. Sanford, Ph.D., Bethesda, Md.
In Vitro Studies on Neoplastic Viruses, Dr. Frederik B. Bang, Baltimore.

Over 250 papers are scheduled for presentation not including those read by title. The business meeting will be held April 11 and the reception, April 12. For information write The American Association for Cancer Research, Inc., 7701 Burholme Ave., Philadelphia 11.

Allergists Meeting in Atlantic City.—The 14th annual congress of the American College of Allergists will be held April 23-25 at the Shelburne, Atlantic City, N. J. An instructional course will be conducted April 20-22. The presidential address will be presented by Dr. Orval R. Withers the afternoon of April 24. Sectional meetings on allergy of the nervous system, technology, pediatric allergy, dermatologic allergy, psychosomatic medicine, ophtho-otolaryngology, and mold allergy will be held April 25. A workshop on medical writing will be conducted with Dr. Jonathan Forman as chairman. The Bela Shick and von Pirquet awards will be presented April 24, following an address, "The Nature of Allergy," presented by Dr. William B. Sherman, president, American Academy of Allergy. Motion pictures and scientific exhibits are planned. For information write the American College of Allergy, 2049 Broadway, Boulder, Colo.

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University Programs in Radiation Biology.—Training and research programs in radiobiology for the preparation of public health experts equipped to guard civilian populations against the health hazards of nuclear radiation will be supported through grants from the Rockefeller Foundation, Harvard University, the Johns Hopkins University, and the University of Pittsburgh have each received a $500,000 grant. Harvard University's School of Public Health has been conducting research since 1947 on radiation problems affecting industry and the public. Instruction in the environmental aspects of radiation started in 1950 as part of the industrial hygiene engineering course and has since expanded in cooperation with several departments of the university. At Johns Hopkins University, the Thomas C. Jenkins Department of Biophysics, the School of Medicine, and the School of Hygiene and Public Health will coordinate and intensify their programs in radiation and radiobiology. The University of Pittsburgh Graduate School of Public Health, through its department of occupational health, has a program of research and teaching which emphasizes the biological effects of ionizing radiation, including the health problems involved in the design and operation of nuclear reactors.

International Meeting on Internal Medicine.—The Fifth International Congress of Internal Medicine will be held April 24-26 in Philadelphia with headquarters at the new Sheraton Hotel. Participants in the opening exercises will be Dr. T. Grier Miller, president of the congress; Dr. Richard A. Kern, president, American College of Physicians; Mayor Richardson Dilworth, of Philadelphia; and Sir Russel Brain, president, International Society of Internal Medicine, sponsor of the congress. The scientific program will include 81 foreign speakers representing 27 other nations, among which are the Soviet Union, Czechoslovakia, Hungary, Rumania, and Poland. The program includes the following panel discussions and moderators:

Anticoagulant Therapy, Dr. Irving S. Wright, professor of clinical medicine, Cornell University Medical College, New York City.

Synthetic Steroid Compounds Used in Rheumatoid Arthritis, Dr. Philip S. Hench, professor of medicine, University of Minnesota, Rochester.

Rehabilitation, Dr. Svend V. Clemmesen, chief physician, department of physical medicine and rheumatology, Municipal Hospital, Copenhagen, Denmark.

Non-professional activities include a symphony concert April 24, the congress banquet April 25, and a luncheon at the University of Pennsylvania Museum April 26. A special ladies program is arranged. Information and registration forms may be obtained from Mr. E. R. Loveland, Secretary-General, Fifth International Congress of Internal Medicine, 4200 Pine St., Philadelphia 4.

Prevalence of Poliomyelitis.—According to the National Office of Vital Statistics, the following number of reported cases of poliomyelitis occurred in the United State, its territories and possessions in the weeks ended as indicated:

Area	March 8, 1958		March 9, 1957 Total
	Paralytic Type	Total Cases Reported	
New England States			
Maine	..	..	..
New Hampshire	..	..	..
Vermont	..	..	..
Massachusetts	..	..	1
Rhode Island	..	..	..
Connecticut	..	..	..
Middle Atlantic States			
New York	..	..	2
New Jersey	..	..	..
Pennsylvania	..	..	..
East North-Central States			
Ohio	..	2	..
Indiana	..	..	..
Illinois	..	..	..
Michigan	..	1	1
Wisconsin	..	..	..
West North Central States			
Minnesota	..	..	..
Iowa	..	..	..
Missouri	..	..	..
North Dakota	1	1	..
South Dakota	..	..	..
Nebraska	..	..	1
Kansas	..	..	..
South Atlantic States			
Delaware	1	1	..
Maryland	..	..	..
District of Columbia	..	..	..
Virginia	..	..	..
West Virginia	..	..	1
North Carolina	..	1	1
South Carolina	..	..	..
Georgia	..	..	..
Florida	2	2	..
East South Central States			
Kentucky	..	..	..
Tennessee	..	..	..
Alabama	..	..	..
Mississippi	..	..	2
West South Central States			
Arkansas	1	1	3
Louisiana	..	..	4
Oklahoma	..	1	1
Texas	3	4	7
Mountain States			
Montana	..	..	..
Idaho	..	..	..
Wyoming	..	..	..
Colorado	..	..	..
New Mexico	..	..	..
Arizona	..	..	1
Utah	..	..	1
Nevada	..	..	..
Pacific States			
Washington	..	1	..
Oregon	..	1	..
California	2	3	7
Territories and Possessions			
Alaska	..	..	..
Hawaii	..	..	..
Puerto Rico	1	1	..
Total	11	20	33

Flying Physicians to Meet in Phoenix.—The annual spring round-up of the Flying Physicians Association will be held April 23-27 with headquarters at the Hotel Valley Ho, Phoenix, Ariz. Dr. Rafael

Samper, of Bogota, Columbia, will present "A Story of Medicine and Flying in Columbia" April 26. The program includes the following:

Physical Fitness in Flying, Dr. James H. Britton, Pasadena, Calif.
Space Travel, Dr. Francis B. Quinn Jr., Los Angeles.
Difficulties in the Interpretation of Pain in the Chest, Dr. Charles H. Scheifley, Rochester, Minn.
Aviation of Tomorrow, Dr. Toby Freedman, Los Angeles.
Trauma, Dr. Roger S. Johnson, Excelsior, Minn.
Crash Deceleration in Private Aircraft Accidents, Dr. Paul T. Haltom Jr., Artesia, Calif.

For information write Dr. Harry Dan Vickers, 25 Jackson St., Little Falls, N. Y.

Annual Meeting of Physicians and Surgeons.—The 15th annual meeting of the Association of American Physicians and Surgeons will be held April 10-12 at the Hotel Mark Hopkins, San Francisco, under the presidency of Dr. Cyrus W. Anderson. The program includes the following:

Twentieth Century Trojan Horse, Dr. Charles W. Pavey, Columbus, Ohio.
Doles for Doctors, Dr. James L. Doenges, Anderson, Ind.
Socialized Medicine by Way of Social Security (Forand Bill), Dr. George J. Hess, Bunker Hill, Ill.
Eventual and Inevitable Folly of "Bricks and Mortar," Dr. Lewis A. Alesen, Los Angeles.
Missiles or Pensions, Dr. Louis M. Orr, Orlando, Fla.
Communist Satellites and Common Sense, Dr. Charles D. Kerr, Houston, Texas.

General Bonner F. Fellers, U. S. Army, retired, will be the banquet speaker April 11. For information write the Association of American Physicians and Surgeons, 185 N. Wabash Ave., Chicago 1.

EXAMINATIONS AND LICENSURE

MEDICAL SPECIALTY BOARDS

AMERICAN BOARD OF ANESTHESIOLOGY: *Written.* Various locations, July 17, 1959. Final date for filing application is January 17, 1959. Sec., Dr. Curtiss B. Hickcox, 80 Seymour St., Hartford.

AMERICAN BOARD OF DERMATOLOGY: *Written. Several Cities,* June 30. *Oral.* Detroit, Oct. 17-19. Final date for filing all applications is April 1. Sec., Dr. Beatrice Maher Kesten, One Haven Ave., New York 32.

AMERICAN BOARD OF INTERNAL MEDICINE: *Written.* Oct. 20, 1958. *Oral.* Philadelphia, April 23-26; San Francisco, June 18-21; Chicago, Oct. 13-16. Sec.-Treas., Dr. William A. Werrell, One West Main St., Madison 3, Wis.

AMERICAN BOARD OF NEUROLOGICAL SURGERY: Examination given twice annually, in the spring and fall. In order to be eligible a candidate must have his application filed at least six months before the examination time. Sec., Dr. Leonard T. Furlow, Washington University School of Medicine, St. Louis 10.

AMERICAN BOARD OF OBSTETRICS AND GYNECOLOGY: *Part II.* Chicago, May 7-17. Final date for filing application was September 1. Sec., Dr. Robert L. Faulkner, 2105 Adelbert Road, Cleveland 6.

AMERICAN BOARD OF OPHTHALMOLOGY: *Written,* Jan. 26, 1959. Final date for filing application is July 1, 1958. *Clinical.* San Francisco, June 17-21; Chicago, Oct. 17-22. Sec., Dr. Merrill J. King, Box 236, Cape Cottage Branch, Portland, Maine.

AMERICAN BOARD OF ORTHOPAEDIC SURGERY: *Part II.* Chicago, Jan. 21-23, 1959. Sec., Dr. Sam W. Banks, 116 South Michigan Avenue, Chicago 3.

AMERICAN BOARD OF OTOLARYNGOLOGY: *Oral.* Chicago, Oct. 6-9. Final date for filing application is March. Sec., Dr. Dean M. Lierle, University Hospitals, Iowa City.

AMERICAN BOARD OF PATHOLOGY: San Francisco, June 30-July 2. Final date for filing application is May 1. Sec., Dr. Edward B. Smith, Indiana University Medical Center, 1042-1232 W. Michigan St., Indianapolis 7.

AMERICAN BOARD OF PEDIATRICS: *Oral.* Atlantic City, May 3-5; Cincinnati, June 13-15; Chicago, Oct. 24-26 and New York, Dec. 5-7. Sec., Dr. John McK. Mitchell, 6 Cushman Road, Rosemont, Pa.

AMERICAN BOARD OF PHYSICAL MEDICINE AND REHABILITATION: *Oral and Written.* Peoria, Ill., June 20-21. Final date for filing application was Feb. 1. Sec., Dr. Earl C. Elkins, 200 First St., S. W., Rochester, Minn.

AMERICAN BOARD OF PLASTIC SURGERY: *Oral and Written.* Galveston, Texas, May 18-20. Corresponding Secretary, Miss Estelle E. Hillerich, 4647 Pershing Ave., St. Louis 8.

AMERICAN BOARD OF PREVENTIVE MEDICINE: *Occupational Medicine,* April 18-20. Final date for filing application was Jan. 30. *Public Health* on a Regional Basis, April. Final date for filing application is Jan. 30. Sec., Dr. Tom F. Whayne, 3438 Walnut St., Philadelphia 4.

AMERICAN BOARD OF PROCTOLOGY: *Oral and Written, Parts I and II.* September 1958. Final date for filing application is March 15. Sec., Dr. Stuart T. Ross, 520 Franklin Ave., Garden City, N. Y.

AMERICAN BOARD OF PSYCHIATRY AND NEUROLOGY: New York City, Dec. 15-16. Training credit for full time psychiatric and/or neurologic assignment in unapproved military programs or services between the dates of Jan. 1, 1950 and Jan. 1, 1954 will be terminated on Jan. 1, 1959. Sec., Dr. David A. Boyd, 102-110 Second Ave. S. W., Rochester, Minn.

AMERICAN BOARD OF RADIOLOGY: *Special Examination in Nuclear Medicine for Diplomates in Radiology or Therapeutic Radiology,* Chicago, May 17. Deadline for filing application was Feb. 1. *Regular Examination in Radiology,* Chicago, May 19-23. Final date for filing application was Jan. 1. *Regular Examination in Radiology.* Washington, D. C., Dec. 8-12. Final date for filing application is July 1. Sec., Dr. H. Dabney Kerr, Kahler Hotel Bldg., Rochester, Minn.

AMERICAN BOARD OF SURGERY: *Oral (Part II).* Chicago, May 12-13; Los Angeles, June 16-17; Portland, June 20-21. Written examinations (Part I) will be held at various centers in the United States, Canada, Hawaii, Puerto Rico, and certain military centers abroad on December 3. The date of the Fall examination in *Part I* has been changed from the last Wednesday of October as announced in its current Booklet of Information to December 3, 1958. Thereafter, examinations in Part I will be held once annually, on the first Wednesday of December. The closing date for filing applications will be August 1. Sec., Dr. John B. Flick, 225 So. 15th St., Philadelphia 2.

BOARD OF THORACIC SURGERY: *Oral.* Boston, May 12-13. Final date for filing application was December 1. The fall written examination will be given in September 1958 and closing date for registration is July 1. Registration for the fall oral examination closes July 1.

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DEATHS

Bengs, Hilding Arvid ● Somerset, Pa.; University of Pennsylvania School of Medicine, Philadelphia, 1930; certified by the National Board of Medical Examiners; member of the American Psychiatric Association; served as director of the Bureau of Mental Health in the State Welfare Department and as the first state commissioner of mental health; formerly secretary of the Warren County (Pa.) Medical Society; for many years associated with the Warren (Pa.) State Hospital; superintendent of the Somerset State Hospital; died Jan. 29, aged 53.

Biddle, Asher Cadden ● Mansfield, Ohio; College of Physicians and Surgeons, Baltimore, 1904; staff physician for the Richland County Health Department; on the staff of the Mansfield General Hospital; died Jan. 13, aged 84, of coronary disease.

Billick, Eugene Wycoff, Colonel, U. S. Army, retired, Arlington, Va.; University of Pittsburgh School of Medicine, 1925; service member of the American Medical Association; entered the medical corps of the U. S. Army as a first lieutenant in 1926; retired Aug. 31, 1956; chief surgeon of the Africa–Middle East Theater during World War II and later surgeon of the Fifth Army; held the Legion of Merit and the United States of America Typhus Commission medals; member of the Sigma Alpha Epsilon and Nu Sigma Nu; died in the Walter Reed Army Hospital, Washington, D. C., Jan. 26, aged 61, of lobar pneumonia with tracheobronchitis.

Bitler, Clyde Clermont, New Castle, Ind.; Indiana University School of Medicine, Indianapolis, 1912; member of the Indiana State Medical Association; veteran of World War I; served two terms on the New Castle City Council; elected to the school board, and served two terms as city health officer; formerly assistant superintendent of the Southeastern Hospital for Insane in Madison; associated with the Henry County Hospital and the Clinic Hospital, where he died Jan. 14, aged 70, of cerebral hemorrhage.

Blaine, Walter C. ● Tuscola, Ill.; University of Pennsylvania Department of Medicine, Philadelphia, 1896; formerly vice-president of the Illinois State Medical Society; member of the House of Delegates of the American Medical Association in 1919; served on the selective service boards during World Wars I and II; physician for the Chicago and Eastern Illinois Railroad; on the staff of the Jarman Memorial Hospital, where he died Jan. 28, aged 89, of chronic nephritis and chronic myocarditis.

Boethel, Nicholas Charles, Hallettsville, Texas; Medical Department of Tulane University of Louisiana, New Orleans, 1901; veteran of World War I; served as a member of the Hallettsville Independent School District Board of Education for many years; formerly on the staff of the Renger Memorial Hospital, where he died Nov. 16, aged 78, of coronary thrombosis.

Bourdon, Evan Covington ● Oakland, Calif.; Baylor University College of Medicine, Dallas, 1937; veteran of World War II; died in the Kaiser Foundation Hospital, Vallejo, Jan. 9, aged 49, of generalized carcinomatosis and carcinoma of the right colon.

Brady, Edwin Herms ● Auburn, Calif.; Creighton University School of Medicine, Omaha, 1941; member of the American College of Chest Physicians and the American Trudeau Society; associated with the DeWitt State Hospital; veteran of World War II; died Jan. 8, aged 57.

Bronfenbrenner, Alice, St. Louis; Washington University School of Medicine, St. Louis, 1950; died in the University of Minnesota Hospital in Minneapolis Jan. 16, aged 31, of renal insufficiency and chronic glomerulonephritis.

Brown, John Edward ● Perry, Mo.; Hospital College of Medicine, Louisville, Ky., 1895; associated with St. Elizabeth's Hospital and Levering Hospital, Hannibal, where he died Jan. 19, aged 91, of cerebral hemorrhage.

Burke, John Patrick Jr. ● California, Mo.; St. Louis University School of Medicine, 1906; veteran of World War I; died in Albuquerque, N. M., Jan. 1, aged 77, of pneumonia.

Bury, Roy Wesley ● Faust, N. Y.; University of Buffalo School of Medicine, 1913; veteran of World War I; on the staff of the Mercy General Hospital in Tupper Lake; died in Sarasota (Fla.) Memorial Hospital, Dec. 29, aged 67, of cerebral hemorrhage and arteriosclerosis.

Campbell, George Malcolm ● South Gate, Calif.; College of Medical Evangelists, Loma Linda and Los Angeles, 1935; member of the American Academy of General Practice; associated with Mission Hospital in Huntington Park and St. Francis Hospital; died in the Glendale (Calif.) Sanitarium and Hospital Jan. 18, aged 47.

● Indicates Member of the American Medical Association.

Carroll, William Vincent ● Trenton, N. J.; Georgetown University School of Medicine, Washington, D. C., 1930; associated with St. Francis Hospital, where he died Jan. 13, aged 51, of rheumatic heart disease.

Clarke, Chester Leonard ● Portland, Maine; New York Homeopathic Medical College and Flower Hospital, New York City, 1916; veteran of World War I; died Jan. 22, aged 67, of bleeding esophageal varices and portal cirrhosis.

Clay, Joseph Valentine Francis, Philadelphia; Hahnemann Medical College and Hospital of Philadelphia, 1906; professor emeritus of otolaryngology at his alma mater; specialist certified by the American Board of Otolaryngology; an associate member of the American Medical Association; fellow of the American College of Surgeons; served on the staff of the Hahnemann Hospital, and as consultant at the Coatesville (Pa.) Hospital and the Allentown (Pa.) State Hospital; died in the Delaware County Hospital in Drexel Hill, Pa., Jan. 22, aged 74, of uremia and hypertensive cardiorenal disease.

Cook, Edward, Hamilton, Ohio; Medical College of Ohio, Cincinnati, 1902; formerly county coroner; associated with Mercy and Fort Hamilton hospitals; died Jan. 19, aged 91, of hypostatic pneumonia.

Cook, Philip Lewis, Colonel, U. S. Army, Ormond Beach, Fla.; University of Pennsylvania School of Medicine, Philadelphia, 1916; certified by the National Board of Medical Examiners; fellow of the American College of Surgeons; veteran of World War I; entered the medical corps of the U. S. Army in 1918 and retired March 31, 1949; died in Daytona Beach Jan. 2, aged 67, of myocardial infarction.

Crook, James W., London, Ky.; Hospital College of Medicine, Louisville, 1907; member of the Kentucky State Medical Association; served as mayor; on the staff of the Marymount Hospital; formerly president of the National Bank of London and the London Federal Savings and Loan Association; died Jan. 26, aged 81, of a heart attack.

Crotti, Andre ● Columbus, Ohio; born in Buenos Aires, Argentina, Aug. 14, 1873; Université de Lausanne Faculté de Médecine, Switzerland, 1900; at one time instructor in anatomy at his alma mater; served on the faculty of the Ohio State University College of Medicine; at one time vice-president of the American Association of Obstetricians, Gynecologists and Abdominal Surgeons; first U. S. president and second international president of the International College of Surgeons; fellow and past-governor of the American College of Surgeons; veteran of World War I; associated with White Cross, Grant, Children's, Mount Carmel, and St. Francis hospitals; a Chevalier of the Legion of Honor of France; in 1932 was made a Knight of the Order of the Crown of Italy in recognition of his work among Italian residents of Columbus; author of "Diseases of the Thyroid, Parathyroids and Thymus"; died Jan. 31, aged 84, of arteriosclerosis.

Dudley, Gerry Brown ● Charleston, Ill.; Cornell University Medical College, New York City, 1904; veteran of World War I; past-president of the Coles County Medical Society; died in the Memorial Community Hospital Jan. 16, aged 82, of uremia.

Dyer, William Holmes ● Kansas City, Kan.; University of Illinois College of Medicine, Chicago, 1916; veteran of World War I; police department surgeon; surgeon for the Santa Fe Railway; died Jan. 21, aged 71.

Earwood, Edgar R., Los Angeles; Drake University College of Medicine, Des Moines, 1912; veteran of World Wars I and II; died Jan. 11, aged 71, of a heart attack.

Eck, Charles Patt ● Chicago; University of Illinois College of Medicine, Chicago, 1916; also a lawyer and pharmacist; veteran of World War I; a physician with the Cook County Health Department; died Jan. 29, aged 68, of arteriosclerotic heart disease.

Ehlers, Orrin Cecil ● Ravenna, Neb.; University of Nebraska College of Medicine, Omaha, 1930; associated with Sacred Heart Hospital in Loup City, Good Samaritan Hospital in Kearney, and St. Francis Hospital in Grand Island; died Jan. 23, aged 52, of a skull fracture received in a plane crash.

Eisaman, Ralph Herbert ● Brownsville, Texas; Northwestern University Medical School, Chicago, 1918; certified by the National Board of Medical Examiners; fellow of the American College of Surgeons; died in the Mercy Hospital Dec. 15, aged 65.

Green, Arda Alden, Baltimore; born in Prospect, Pa., May 7, 1899; Johns Hopkins University School of Medicine, Baltimore, 1927; research associate, department of biology, Johns Hopkins University, where she joined the McCollum–Pratt Institute in 1953; last September was awarded the Garvan Medal by the American Chemical Society; formerly assistant professor of biochemistry in the Washington University School of Medicine in St. Louis; served with research division of the Cleveland Clinic; research associate and biochemical consultant, Sinai Hospital, where she died Jan. 23, aged 58, of carcinoma of the breast.

Gussow, Louis, Syracuse, N. Y.; Syracuse University College of Medicine, 1927; veteran of World

War II; associated with Crouse-Irving Hospital; died in the Veterans Administration Hospital Jan. 5, aged 59, of cancer.

Harding, George H. Jr. ● Nashville, Tenn.; University of Nashville Medical Department, 1907; died in the Baptist Hospital Jan. 10, aged 74.

Harkness, Robert Bruce ● Kennett Square, Pa.; Memphis (Tenn.) Hospital Medical College, 1899; member of the Michigan State Medical Society; fellow of the American College of Physicians; veteran of World War I; formerly practiced in Hastings, Mich., serving as director of the Barry County Health Department; formerly member and in 1939 elected president of the State Council of Health of Michigan; at one time on the staff of the Kellogg Foundation in Battle Creek, Mich.; died Jan. 21, aged 82.

Harllee, Chauncey Mitchell Depew ● Philadelphia; Howard University College of Medicine, Washington, D. C., 1918; served on the staff of the Mercy-Douglass Hospital; died Jan. 17, aged 64, of heart disease.

Harnagel, Edward John ● Des Moines, Iowa; Jefferson Medical College of Philadelphia, 1910; fellow of the American College of Surgeons; past-president of the Polk County Medical Society; veteran of World War I; on the staffs of the Iowa Methodist, Iowa Lutheran, and Mercy hospitals; died Jan. 7, aged 76, of cancer.

Harris, Charles Houston ● Fort Worth, Texas; born in Alvarado, July 11, 1869; St. Louis College of Physicians and Surgeons, 1899; in 1906 member of the House of Delegates of the American Medical Association; fellow of the American College of Surgeons; past-president of the Tarrant County Medical Society; at one time vice-president of the Texas Medical Association; served as a trustee of Texas Christian University, where he received an honorary degree; held honorary degrees from Southwestern University at Georgetown and Texas Wesleyan College; associated with the Harris Hospital, where he died Jan. 20, aged 88, of carcinoma of the prostate.

Harvey, Basil Coleman Hyatt, Chicago; University of Toronto Faculty of Medicine, Toronto, Ontario, Canada, 1898; professor emeritus of anatomy at University of Chicago, The School of Medicine, where he was at one time dean of students; past-vice-president of the Institute of Medicine of Chicago and past-treasurer of the Association of American Medical Colleges; served with the American Expeditionary Force in France during World War I; died in the Albert Merritt Billings Hospital Feb. 15, aged 83, of neoplasm of pancreas.

Heger, Frank Ferdinand ● San Antonio, Texas; St. Louis University School of Medicine, 1928; veteran of World War II; associated with Santa Rosa and Nix hospitals; died Jan. 19, aged 59, of coronary occlusion.

Helm, Harold McMurdo ● Rockton, Ill.; Rush Medical College, Chicago, 1914; member of the State Medical Society of Wisconsin; formerly practiced in Beloit, Wis., where he was on the staff of the Beloit Hospital and where he died Jan. 3, aged 69, of cerebral hemorrhage.

Hetherington, Clark Edward ● Cincinnati; Chicago Homeopathic Medical College, 1901; died in the Christ Hospital, Cincinnati, Jan. 10, aged 83.

Hodnett, William Selden, Richmond, Va.; University College of Medicine, Richmond, 1910; on the staff of the Grace Hospital, where he died Jan. 6, aged 71, of uremia.

Hoecker, Wade Lee, Galveston, Texas; University of Texas School of Medicine, Galveston, 1909; veteran of World War I; formerly city health officer; associated with St. Mary's Infirmary; died Jan. 4, aged 71, of cerebrovascular accident.

Hoffman, Gideon H. ● Kewanee, Ill.; Western Reserve University Medical Department, Cleveland, 1898; associated with St. Francis Hospital and later Kewanee Public Hospital, where he died Jan. 25, aged 86, of cerebral thrombosis.

Holt, Thomas Tallman ● Wichita, Kan.; University Medical College of Kansas City, Mo., 1900; specialist certified by the American Board of Internal Medicine; fellow of the American College of Physicians, of which he was an ex-vice-president and ex-governor; died in St. Francis Hospital Jan. 18, aged 81, of cerebral vascular accident.

Hooper, Rector Clay ● Jonesboro, Ark.; University of Arkansas School of Medicine, Little Rock, 1939; specialist certified by the American Board of Urology; fellow of the American College of Surgeons; past-president of the Craighead-Poinsett Counties Medical Society; member of the Jonesboro Chamber of Commerce; chief of medical staff, St. Bernard's Hospital, where he died Jan. 15, aged 46, of coronary thrombosis.

Horsfall, William ● Coos Bay, Ore.; Cooper Medical College, San Francisco, 1892; served as president of the Coos-Curry Counties Medical Society; once county coroner; in 1939 elected as First Citizen of Coos Bay; died Jan. 17, aged 91, of coronary disease.

Houchins, Edward Kenna, Las Vegas, N. M.; Chicago College of Medicine and Surgery, 1916; died in Charleston, W. Va., Jan. 3, aged 73, of arteriosclerosis and cerebral hemorrhage.

Ingram, Clarence Hogue Jr. ● Pittsburgh; University of Pennsylvania School of Medicine, Philadelphia, 1929; specialist certified by the American Board of Obstetrics and Gynecology; fellow of the American College of Surgeons; president-elect of the Allegheny County Medical Society; past-president of the Obstetrical Society of Pittsburgh; associated with Western Pennsylvania Hospital, where he died Jan. 22, aged 53.

Irwin, James Walter, Eaton Rapids, Mich.; University of Michigan Department of Medicine and Surgery, Ann Arbor, 1892; died in the Stimson Community Hospital Jan. 3, aged 89.

Johnson, John Frank ● Macon, Ga.; Emory University School of Medicine, Atlanta, 1940; interned at the Grady Hospital in Atlanta; served a residency at the Carraway Methodist Hospital in Birmingham, Ala.; veteran of World War II; associated with the Macon Hospital; died Jan. 12, aged 42, of coronary thrombosis.

Kahn, Isidore Stanley ● San Antonio, Texas; Harvard Medical School, Boston, 1904; fellow of the American College of Physicians; specialist certified by the American Board of Internal Medicine; veteran of World War I; associated with Nix Memorial and Santa Rosa hospitals; died Jan. 27, aged 78.

Lawler, Charles Arthur, Salamanca, N. Y.; University of Buffalo School of Medicine, 1911; an associate member of the American Medical Association; served as president of the Cattaraugus County Medical Society; veteran of World War I; died in the Buffalo (N. Y.) General Hospital Dec. 8, aged 70.

Le Valley, Thomas Alexander ● Van Nuys, Calif.; Tulane University School of Medicine, New Orleans, 1936; assistant professor of urology at the College of Medical Evangelists, Loma Linda and Los Angeles; specialist certified by the American Board of Urology; fellow of the American College of Surgeons; associated with St. Joseph Hospital in Burbank, Physicians and Surgeons Hospital in Glendale, and the Los Angeles County General Hospital; died Jan. 1, aged 51.

Lewis, Frank Clark, New York City; University of Vermont College of Medicine, Burlington, 1902; died Jan. 1, aged 80, of bronchopneumonia, hypertensive heart disease, and cerebral arteriosclerosis.

Lorber, Herman, New York City; Columbia University College of Physicians and Surgeons, New York City, 1903; specialist certified by the American Board of Obstetrics and Gynecology; an associate member of the American Medical Association; associated with the Beth Israel Hospital; died in the Temple University Hospital, Philadelphia, Jan. 30, aged 78.

Luckie, Kenneth Earl, Selma, Ala.; Tulane University School of Medicine, New Orleans, 1927; member of the Medical Association of the State of Alabama; fellow of the Southeastern Surgical Congress and the American College of Surgeons; past-president of the Dallas County Medical Society; district surgeon, Southern Railway; associated with Selma Baptist Hospital, where he died Jan. 1, aged 54, of circulatory collapse.

Lyon, Ervin F., Jr. ● San Antonio, Texas; Baylor University College of Medicine, Dallas, 1931; specialist certified by the American Board of Radiology; member of the Radiological Society of North America and the American College of Radiology; veteran of World War II; associated with Baptist Memorial Hospital, where he died Jan. 2, aged 49, of cerebral hemorrhage.

McAtee, John Donald, Tuscaloosa, Ala.; Rush Medical College, Chicago, 1937; member of the American Psychiatric Association; veteran of World War II; died in Evanston, Ill., Jan. 26, aged 45, of coronary occlusion.

McClellan, William Jennings, Houston, Texas; Memphis (Tenn.) Hospital Medical College, 1889; died Jan. 15, aged 93, following a fracture of the hip.

McCracken, Joseph Hill Jr. ● Dallas, Texas; Baylor University College of Medicine, Dallas, 1926; formerly on the faculty of his alma mater and the Southwestern Medical School of the University of Texas; died Jan. 18, aged 57.

McDermott, Edward Leo, Captain, U. S. Navy, retired, Rochester, N. Y.; Albany (N. Y.) Medical College, 1916; service member of the American Medical Association; entered the U. S. Navy in 1919; retired Jan. 1, 1944; died in West Palm Beach, Fla., Jan. 12, aged 70, of cerebral thrombosis.

McGuire, Charles A., Atlantic City, N. J.; Howard University College of Medicine, Washington, D. C., 1909; died in Paulsboro Dec. 27, aged 84.

McKenzie, Prentiss, Evanston, Ill.; Jenner Medical College, Chicago, 1916; died Feb. 1, aged 85.

McNulty, Edward Tinney, Brooklyn; Columbia University College of Physicians and Surgeons, New York City, 1906; died Jan. 19, aged 76, of arteriosclerotic heart disease.

Marshall, William J. ● Geneva, Pa.; Eclectic Medical Institute, Cincinnati, 1905; died in the Hamot Hospital, Erie, Jan. 8, aged 85, of injuries received in an automobile accident.

Matheson, Elizabeth Beckett, San Antonio, Texas; Trinity Medical College, Toronto, Ontario, Canada, 1898; Manitoba Medical College, Winnipeg, Mani-

toba, Canada, 1904; for many years a medical missionary in Onion Lake, Saskatchewan; for 23 years assistant health inspector for public schools in Winnipeg, Canada; died Jan. 15, aged 92, of cerebral thrombosis.

Mattill, Peter Milton ● Oak Terrace, Minn.; born in 1887; Rush Medical College, Chicago, 1919; specialist certified by the American Board of Internal Medicine; member of the American Trudeau Society and past-president of the Minnesota Chapter; fellow of the American College of Physicians; clinical assistant of medicine at the University of Minnesota Medical School in Minneapolis from 1926 to 1946 and later instructor at the school of nursing; served as assistant superintendent and associate medical director of the Glen Lake Sanatorium; died in Northwestern Hospital, Minneapolis, Jan. 12, aged 70, of mesenchymoma retroperitoneal with extension to the spinal dura.

Meadows, Russell Jr. ● Indio, Calif.; Northwestern University Medical School, Chicago, 1945; veteran of World War II; interned at Naval Hospital in Long Beach, Calif.; served a residency at the Alexian Brothers Hospital in Chicago, Veterans Administration Hospital in Hines, Ill., and the Warren (Pa.) State Hospital, where he was for five years clinical director; served on the staff of the Veterans Administration Hospital in San Fernando; affiliated with Coachilla Valley Hospital; found dead Jan. 29, aged 37.

Messmore, John Lindsey ● Masontown, Pa.; University of Maryland School of Medicine, Baltimore, 1909; past-president of the Fayette County Medical Society; veteran of World War I; died Jan. 3, aged 70, of cerebral hemorrhage.

Meyer, William Henry ● Poughkeepsie, N. Y.; Albany (N. Y.) Medical College, 1931; certified by the National Board of Medical Examiners; fellow of the American College of Surgeons; past-president of the Mid Hudson Surgical Society and the Poughkeepsie Rotary; past chief of staff and chief of the surgical division, Vassar Brothers Hospital, where he died Jan. 12, aged 52, of cerebrovascular accident.

Molt, William Frank ● Indianapolis; born Oct. 18, 1876; Physio-Medical College of Indiana, Indianapolis, 1897; specialist certified by the American Board of Otolaryngology; clinical professor emeritus of broncho-esophagology at the Indiana University School of Medicine; life member of the American Academy of Ophthalmology and Otolaryngology; senior member of the American Broncho-Esophagological Association; on the staff of the Indiana University Medical Center, Indianapolis General Hospital, Methodist Hospital, and St. Vincent's Hospital; died Jan. 12, aged 81, of arteriosclerosis.

Moore, John Terrell ● Tampa, Fla.; Emory University School of Medicine, Atlanta, 1916; veteran of World War I; served on the staffs of the Tampa Municipal Hospital, St. Joseph's Hospital, and Centro Asturiano Hospital; died Jan. 11, aged 74, of heart disease.

Mulkey, Young J. ● Fort Worth, Texas; Fort Worth School of Medicine, Medical Department of Texas Christian University, 1909; Medico-Chirurgical College of Philadelphia, 1912; member of the American Academy of General Practice; veteran of World War I; died Jan. 27, aged 70.

Mundell, Walter Newton ● Hutchinson, Kan.; University of Kansas School of Medicine, Kansas City, 1914; veteran of World War I; associated with the Grace Hospital, where he died Jan. 2, aged 77, of coronary thrombosis.

Munson, Edwin Sterling, Yonkers, N. Y.; New York Homeopathic Medical College and Hospital, New York City, 1894; emeritus professor of ophthalmology at the New York Medical College, Flower and Fifth Avenue Hospitals; fellow of the American College of Surgeons; died Feb. 2, aged 87.

Nagel, Sigmund, New York City; Medizinische Fakultät der Universität, Vienna, Austria, 1922; member of the Medical Society of the State of New York and the American Society of Anesthesiologists; associated with the Montefiore Hospital; died Nov. 28, aged 64.

Nealon, William Francis ● Schenectady, N. Y.; Albany (N. Y.) Medical College, 1915; past-president of the Schenectady County Medical Society; member of the American Academy of General Practice; surgeon in the police department of Schenectady; veteran of World War I; associated with the Ellis and St. Clare's hospitals; died Jan. 3, aged 69, of carcinoma of the transverse colon.

Nelson, Harry Charles ● Santa Ana, Calif.; College of Medical Evangelists, Loma Linda and Los Angeles, 1916; died Jan. 9, aged 72, of acute coronary thrombosis.

Nicoll, Dorothy B., Bronxville, N. Y.; Hering Medical College, Chicago, 1904; formerly practiced in Topeka, Kan.; died in the Lawrence Hospital Jan. 21, aged 92.

Norcross, John Ruger ● Chicago; Northwestern University Medical School, Chicago, 1932; associate professor of orthopedic surgery at his alma mater; specialist certified by the American Board of Orthopaedic Surgery; member of the American Orthopaedic Association, Clinical Orthopaedic Society, and the American Academy of Orthopaedic Surgeons; past-president and secretary of the Chicago Orthopaedic Society; on the staff of St. Luke's Hospital; died Feb. 16, aged 51.

O'Malley, Thomas Stanley ● Milwaukee; Columbia University College of Physicians and Surgeons, New York City, 1918; member of the Industrial Medical Association; fellow of the American College of Surgeons; associated with the Milwaukee Hospital, where he died Jan. 9, aged 65, of dissecting abdominal aortic aneurysm and arteriosclerosis with cerebrovascular occlusion.

Onderdonk, Harrie Jay ● Old Saybrook, Conn.; New York University Medical College, New York City, 1897; for many years medical examiner in East Hartford; served on the staffs of the Hartford and St. Francis hospitals in Hartford; died Jan. 8, aged 85, of coronary occlusion.

Ostrander, Charles Turner, Syracuse, N. Y.; Syracuse University College of Medicine, 1900; an associate member of the American Medical Association; died Jan. 30, aged 82, of coronary disease.

Ownbey, Arthur Dennis, Greensboro, N. C.; Medical College of Virginia, Richmond, 1920; formerly secretary of the Guilford County Medical Society; for many years on the staff of St. Leo's Hospital; died in the Moses H. Cone Hospital Jan. 9, aged 62.

Parker, John Lee ● Snyder, Ark.; Louisville (Ky.) Medical College, 1894; died Jan. 30, aged 84.

Payn, Abbott Smith, New York City; Georgetown University School of Medicine, Washington, D. C., 1895; an associate member of the American Medical Association; died in the Bellevue Hospital Jan. 3, aged 84, of myocardial infarction and pulmonary tuberculosis.

Peaslee, Clarence Capen Jr., Portland, Maine; Yale University School of Medicine, New Haven, 1927; member of the Maine Medical Association; died Jan. 6, aged 57.

Porch, Charles Lee, Portland, Ore.; Maryland Medical College, Baltimore, 1905; died Jan. 9, aged 79, of arteriosclerotic heart disease.

Pruitt, Charles Clement, Comanche, Okla.; Eclectic Medical Institute, Cincinnati, 1899; served as mayor; died Jan. 7, aged 85.

Purinton, Charles Oscar ● New Hartford, Conn.; Yale University School of Medicine, New Haven, 1900; veteran of World War I; for many years on the staff of the Veterans Administration Hospital in Sunmount, N. Y.; died in Winsted, Conn., Jan. 12, aged 83, of arteriosclerosis.

Reeves, William S., Hillsboro, Ky.; Hospital College of Medicine, Louisville, 1891; an associate member of the American Medical Association; died Jan. 23, aged 92.

Regan, Timothy Francis ● Johnstown, Pa.; Tufts College Medical School, Boston, 1930; veteran of World War II; on the staff of the Mercy Hospital; died Jan. 13, aged 50, of coronary occlusion.

Reitzel, Walter Maywood ● San Diego, Calif.; Kansas City (Mo.) Medical College, 1900; for many years practiced in Manhattan, Kan.; died Jan. 21, aged 79, of cancer.

Rhoads, John Peter ● Tioga, Pa.; University of Maryland School of Medicine and College of Physicians and Surgeons, Baltimore, 1931; veteran of World War II; died in Gettysburg Dec. 30, aged 55, of pulmonary embolism.

Richardson, Jennie May, Ilion, N. Y.; Woman's Medical College of the New York Infirmary for Women and Children, New York City, 1892; associated with the Ilion Hospital, where she died Jan. 18, aged 95, of fracture of the hip received in a fall and arteriosclerosis.

Richardson, John Breckinridge Jr., Louisville, Ky.; Louisville Medical College, 1902; an associate member of the American Medical Association; veteran of World War I; died Jan. 12, aged 81.

Roberts, Thomas Willett ● Metropolis, Ill.; St. Louis College of Physicians and Surgeons, 1898; veteran of World War I; honorary president of staff, Massac Memorial Hospital; died Jan. 5, aged 85, of acute myocardial failure.

Robinson, George Wilse ● Kansas City, Mo.; born in Appleton Aug. 1, 1871; Beaumont Hospital Medical College, St. Louis, 1896; specialist certified by the American Board of Psychiatry and Neurology; member of the House of Delegates of the American Medical Association in 1913 and from 1924 to 1927; member of the American Psychiatric Association; past-president of the Missouri State Medical Association; at one time professor of physiology at the University Medical College of Kansas City; served in France during World War I; formerly superintendent of the State Hospital at Nevada; founder and medical director of the Neurological Hospital, where he died Jan. 22, aged 86.

Rogers, Gaston Wilder, Lieut. Colonel, U. S. Army, retired, Chapel Hill, N. C.; Birmingham Medical College, 1911; entered the U. S. Army in 1920; veteran of World War I; retired in 1937 for disability in line of duty; service member of the American Medical Association; connected with the health department; died in a hospital at Durham Jan. 9, aged 73.

Sams, Joseph Henry ● Clarion, Iowa; State University of Iowa College of Medicine, Iowa City, 1892; formerly member and president of the state board of medical examiners; served as member of the local board of health and state board of health, as member of the school board of Clarion, and as coroner of Wright County; died in the Clarion Memorial Hospital Jan. 1, aged 91, of lobar pneumonia.

Scott, Sophie Hinze ● Des Moines, Iowa; Drake University Medical Department, Des Moines, 1893; past-president of the State Society of Iowa Medical Women; died Jan. 6, aged 87.

Senear, Francis Eugene ● Chicago; born in Salamanca, N. Y., Nov. 5, 1889; University of Michigan Medical School, Ann Arbor, 1914; professor of dermatology emeritus at the University of Illinois College of Medicine, where he joined the faculty in 1916 as instructor in dermatology, subsequently becoming associate, assistant professor, associate professor, and from 1923 to 1955 professor and head of the department of dermatology; in 1915-1916 instructor in dermatology at his alma mater; member of the House of Delegates of the American Medical Association from 1929 to 1933 and formerly secretary and chairman of the Section on Dermatology and Syphilology; served on the Section's executive committee for two years; from 1939 to 1941 member, and from 1946 to 1951 president of the American Board of Dermatology and Syphilology; in 1935 president of the section of dermatology and syphilology of the Pan-American Medical Congress; past-president of the Chicago Dermatological Society, American Dermatological Association, and the American Academy of Dermatology; member of the Institute of Medicine of Chicago, Alpha Omega Alpha, Sigma Xi, Pi Kappa Epsilon, and Nu Sigma Nu; fellow of the American College of Physicians; corresponding member of the Danish, Austrian, and Swedish dermatological societies; honorary member of the Australian, British, Italian, and Manhattan dermatological societies; in 1957 elected president of the International Congress of Dermatology in Stockholm, Sweden; honorary vice-president of the International Congress on Dermatology in London in 1952; special consultant for the U. S. Public Health Service; associated with the Ravenswood, Presbyterian, St. Joseph's, and Illinois Central Railroad hospitals; consulting dermatologist for the Illinois Central Railroad; joint editor of "Year Book of Dermatology and Urology"; died in Winnetka, Ill., Feb. 11, aged 68, of coronary disease.

Shellhouse, Luther Harvie ● Willacoochee, Ga.; Medical College of Georgia, Augusta, 1910; past-chairman of the Atkinson County Board of Health; died in the State Hospital, Milledgeville, Jan. 2, aged 74, of cerebral thrombosis.

Snell, Howard Bayard, Old Greenwich, Conn.; Long Island College Hospital, Brooklyn, 1899; an associate member of the American Medical Association; member of the Medical Society of the State of New York; formerly practiced in Brooklyn, where he was an honorary staff member at Prospect Heights Hospital; died in Clinton, Dec. 8, aged 81, of cancer.

Spaulding, Nelson Williamson Vincent, Jacksonville, Fla.; Howard University College of Medicine, Washington, D. C., 1944; served in the Korean War; died in Townsend, Ga., Dec. 22, aged 38, of pulmonary embolus.

Spivey, William E., Brownsville, Texas; Dallas (Texas) Medical College, 1903; served as health officer; died Dec. 19, aged 89, of cerebrovascular accident.

Thyson, Leo Cromwell, Captain, U. S. Navy, retired, Washington, D. C.; born in Washington, Oct. 4, 1890; George Washington University School of Medicine, Washington, 1916; appointed lieutenant (jg) in the Navy in 1917 and retired Nov. 1, 1952; among the ships to which he was assigned was the cruiser USS Pensacola; chief of medicine at the U. S. Naval Hospital at Bremerton, Wash., before being assigned to the Marine detachment at Peiping, where he was taken prisoner; one of the first American prisoners of war during World War II; awarded the Legion of Merit during July, 1946, and the Distinguished Service Medal June 19, 1950, "for exceptionally meritorious conduct in the performance of outstanding services to the government of the United States while a prisoner of war at the Japanese prison camps near Shanghai and Fengtai, China, and at Hakodate, Japan, from Feb. 1, 1942 to Sept. 14, 1945"; service member of the American Medical Association; died Jan. 9, aged 67, of a heart attack.

Wahn, Henry, New York City; New York University Medical College, New York City, 1898; an associate member of the American Medical Association; associated with St. Francis Hospital; died in the Frances Schervier Hospital Jan. 23, aged 85, of cerebral thrombosis and arteriosclerosis.

Walker, George Leon ● Wilmington, Del.; Hahnemann Medical College and Hospital of Philadelphia, 1928; veteran of World War II; served on the staffs of the Women's Hospital in Philadelphia and St. Francis Hospital; died in Bel Air, Md., Jan. 13, aged 58, of a heart attack.

White, Marion L. ● Dixon, Ill.; Keokuk (Iowa) Medical College, 1894; served on the staff of the Dixon Public Hospital; died Dec. 8, aged 92, of myocardial failure and arteriosclerosis.

Williamson, Drue Baldwin, Jacksonville, Texas; University of Texas School of Medicine, Galveston, 1909; died Dec. 5, aged 81, of arthritis and gastric ulcer.

Worrell, Laurence Randolph ● Norwich, N. Y.; Albany (N. Y.) Medical College, 1914; formerly practiced in Albany, where he was on the staff of St. Peter's and Albany hospitals; on the staff of the Chenango Memorial Hospital; died Jan. 14, aged 69.

FOREIGN LETTERS

AUSTRIA

Inspection of Industrial Medical Facilities.—The Austrian Chamber of Physicians has assiduously championed the cause of full-time factory and plant physicians as the best means of according the workers more comprehensive medical care than the Austrian State Social Medical Scheme and its involved bureaucracy can offer. Dr. Konrad Eberle, President of the Chamber of Physicians, invited a number of physicians and reporters to visit some of the plants in Vienna and environs to observe firsthand how efficiently the full-time factory physicians can care for their charges. The Austrian Medical Association hopes eventually to place a trained physician in every major factory in Austria. As a result of this plan, postgraduate courses in industrial medicine were organized by the chamber and, in 1957, 300 physicians attended these courses. The success of these courses was such that all 300 doctors who completed them were placed in corporations and factories either on a full-time or half-time basis. The Austrian Medical Association is enthusiastic concerning this response and believe that in this manner a decisive blow can be struck against socialized medicine.

In January Dr. Eberle inspected the medical facilities of a meat processing plant in Vienna and a yarn factory in Vöslau. Those of the meat processing plant were still in the stage of development; but this medical department was the first to be established on the basis of a contract between the Chamber of Physicians and an industrial plant regarding the functions of the plant physician. Representatives of employers and employees both expressed great satisfaction with the new arrangement, and it is planned to extend the function of the plant physician.

The medical facilities of the yarn factory were laid out on a large scale and have proved their practical value in the eight years they have been in existence. The employees were getting good care and the management was anxious to preserve and improve the health of the employees. Dr. Eberle believed that when employees have learned to appreciate the advantages of having a plant physician, they not only will accept one but will demand one. One of the great advantages of an industrial medical service for both employer and employee is its emphasis on preventive measures. Whereas, at first, compensation laws were concerned chiefly with accidents at the place of work, now more and more acute and chronic diseases, due to the influence of work materials and work procedures, have had to be included in these laws.

A large number of work accidents and occupational diseases occur annually in Austria. In 1956, there were 110,746 and, in 1955, there were 100,298 industrial accidents reported. Of this number, 385 in 1956 and 389 in 1955 were fatal. The number of occupational diseases reported in 1956 was 1,077 (2 fatal) and in 1955 was 807 (21 fatal). The number of accidents among adolescents was 9,001 (17 fatal) in 1956 and 7,169 (23 fatal) in 1955. Because automation signifies merely a shifting of the human factor, never the establishment of the primacy of the machine, care for human health and preservation of human working capacity are the most important requirements. Accidental injuries and occupational diseases are, however, the chief threats to the health of the worker and his working capacity. Possible discrepancies between the worker's capacities and the demands made on him should be evaluated. To use the new type of therapy, that is, to evaluate work conditions hygienically and with an eye to quantity in relationship to human capabilities, opens new and promising prospects in industrial medicine. Next to prevention, rehabilitation constitutes the most important work of the plant physician.

In 1956 there were in Austria about 5.4 persons of working age to each person receiving a pension. If the birth rate remains the same, the ratio in 1965 will decline to 4.8:1, and by 1980 it will only be 4:1. Expressed in a different manner, given the prevailing tendency in the expansion in population the portion of the total population that is between 18 and 65 years of age will decrease by 1% up to 1980; however, the pensioners over 65 years of age will increase by 32%. The heavy load which is increased by each advancement in social services and which rests on the shoulders of the working part of the population makes it imperative to use all measures that can ameliorate the human work potential and beyond that make it possible to supply to industry, in the constantly shrinking labor markets, workers who, although partly handicapped by age or illness, can still do nearly a full day's work. To accomplish this it is necessary to install more physicians in industry. Although today nearly 200 physicians in Austria are employed in industrial plants of various types and sizes, this is only a modest beginning.

The items in these letters are contributed by regular correspondents in the various foreign countries.

BRAZIL

Streptococcus.—Dr. C. Solé-Vernin of the Instituto de Microbiologia Medica of Rio de Janeiro made nose and throat cultures for streptococci. He compared aerobic, microaerophilic (with 10% CO_2), and enrichment culture methods. From 597 fished colonies, 60 (10%) did not develop. From the 537 colonies that gave positive subcultures, 231 (43.5%) were shown to be streptococci. Pike's enrichment procedure increased the percentage of isolated colonies from 50% (under aerobic or microaerophilic conditions) to 80%. Dr. Vernin believed that aerobic cultures for streptococci should be discontinued. In the nasal cultures other organisms were much more abundant than streptococci. No Hemophilus hemolyticus or Diplococcus pneumoniae were found in these cultures. This suggests a different constitution of the normal flora in the population of Rio de Janeiro than that observed elsewhere.

Glomerulonephritis.—Nitrogen mustard is useful in the treatment of chronic glomerulonephritis with nephrotic syndrome according to Drs. P. Lima and A. Rofeld (*Revisto do Hospital das clinicas*, vol. 12, December, 1957). Nitrogen mustard was used to treat three patients with chronic glomerulonephritis with nephrotic syndrome. In two, good clinical and laboratory results were observed. In one of these improvement was evident after the first application of the drug, but the laboratory findings returned to normal slowly.

INDIA

Uterine Tuberculosis.—Malkani and Bannerjee (*Journal Obstetrics and Gynecology of India*, vol. 8, December, 1957) analyzed a series of 33 patients with tuberculosis of the uterine cervix diagnosed from 1952 to 1956. In this same period, there were 257 cases of genital tuberculosis in women. The disease was found in all age groups. Erosion of the cervix was seen in 19 patients, adnexitis in 10, and ulceration in 4. None of the patients had pathognomonic symptoms. Most complained of vaginal discharge. Radiologic examination of the lungs revealed active pulmonary tuberculosis in two, and one showed evidence of healed pleurisy. Although a stained smear of the cervical discharge from all patients was examined, acid-fast bacilli were demonstrated in only one such smear. The diagnosis was based on histological examination of a cervical biopsy specimen. In 21 patients the diagnosis was made from a biopsy of the portio vaginalis. In seven patients with tuberculosis of the endocervix, the diagnosis was made from endometrial material obtained by curettage. Curettage was performed on all patients with cervical tuberculosis. In this series, 26 showed evidence of endometrial tuberculosis. In the rest, the endometrial scrapings were too scanty for diagnosis, especially in patients suffering from amenorrhea in whom the endometrium was atrophic. Fourteen patients received antituberculous treatment and all of these were cured. Whereas the lesion in the endometrium showed healing in 8 to 12 weeks, the cervical tuberculosis required about 24 weeks of continuous treatment with antituberculosis drugs.

Depressant Action of Rauwolfia.—Bose and Vijayavargiya (*Current Science*, vol. 26, December, 1957) stated that although much chemical and pharmacological work has been done with the isolated active principles, the action of Rauwolfia serpentina remains complex. Little has been done to elicit the mechanism of Rauwolfia depressant action on various systems. The authors studied the action of three alkaloids of the plant (reserpine, serpentine, and ajmaline) on the oxygen consumption of brain, liver, and heart tissues of rats, using the Warburg technique. Reserpine had a marked depressant action on the oxygen consumption of these tissues, there being a gradual inhibition of respiration with increasing doses. Serpentine also showed a depressant action on these tissues, but the effect was quantitatively less than in the case of reserpine. Unlike reserpine and serpentine, low concentrations of ajmaline caused an increase in oxygen consumption in these tissues, but with higher concentrations there was an appreciable reduction in tissue respiration. Thus of the three alkaloids, reserpine appeared to possess the maximum depressant effect on the oxygen uptake. Reserpine, which is the most potent hypotensive and sedative principle of Rauwolfia, is also the most potent inhibitor of brain tissue respiration which may account for its sedative property. The bradycardia produced by the alkaloid may be due to the diminished oxygen uptake of the cardiac tissue. The stimulation of tissue respiration by ajmaline in smaller doses may be responsible for its convulsant property. Its hypotensive effect in larger doses may be due to its depressant effect on respiration of heart muscle. The alkaloids may have a direct inhibitory action on the cellular metabolism affecting the respiratory dehydrogenase enzyme system. Reserpine has also been found to produce a marked inhibition of succinic dehydrogenase activity in these tissues.

Urinary Excretion of Vitamins.—Pai and Patel (*Journal Obstetrics and Gynecology of India*, vol. 8, December, 1957) studied the relationship between deficiency of vitamin B complex and the toxemias of pregnancy. The test dose used was 5 mg. each of thiamine and riboflavin and 50 mg. of nicotinic acid. The percentage return of each vitamin after giving the test dose was determined. Seven normal healthy women of 19 to 22 were studied for the 24-hour urinary excretion of the three vitamins before and after the test dose was given. The

daily urinary output of thiamine varied between 113.7 and 438.7 mcg. (average 267.1 mcg.). The percentage return of the test dose when 5 mg. was given orally varied from 7.29 to 19.05 (average 12.64 ± 1.43%). The daily urinary riboflavin excretion ranged from 369.0 to 785.7 mcg. (average 517.8 mcg.). The percentage return of this vitamin after 5 mg. was given varied between 16.26 and 43.44 (average 25.64 ± 3.72%). The excretion of nicotinic acid before the test dose ranged from 1.02 to 6.51 mg. (average 3.24 mg.). The percentage return after 50 mg. was given, ranged from 3.69 to 16.03 (average 9.75 ± 1.68%). There was no relation between the test dose return of any of these vitamins and the levels of their urinary excretion.

Postgraduate Medical Training.—A four-year course of postgraduate medical training similar to that offered in American universities is being introduced in the K. G. Medical College, Lucknow, under a comprehensive scheme of the state government. The scheme, known as the Resident Training Scheme, is being jointly financed by the state government and the Rockefeller Foundation. The new course is designed to reorient the present residency training program of the college and aims at giving a sound general clinical training and, thereafter, help in the training of specialists in various branches of medical science. It will admit 100 trainees every year. The assistance offered by the Rockefeller Foundation will last only for the first four years, after which the sole responsibility of its financial burden will lie on the state government. The trainees will be given "pocket" expenses at varying rates from year to year in addition to board and lodging. In the initial two or three years, the Rockefeller Foundation might supply some eminent physicians and surgeons from the United States to help in implementing this new program. The foundation might also send one or two members of the staff of this institution abroad to study the training programs in other countries.

Experimental Hydronephrosis.—B. N. Balkrishna Rao and co-workers showed in earlier experiments that sudden complete ureteric obstruction can produce hydronephrosis. It was also thought that a kidney under stress of complete ureteral obstruction and undergoing hydronephrotic changes should be able to recover if the cause were removed. The damage would be related to the duration of stress and there should be an optimal period when, with the removal of the cause, the kidney should partially or wholly regain its normal function. The authors (*Indian Journal of Surgery*, vol. 19, December, 1957) have now reported the preliminary results of drainage of the hydronephrotic kidney with a view to determining the stage of reversibility. Dogs were used for the study and the earlier results of sudden complete ureteral obstruction leading to hydronephrosis were confirmed. The principle of the study was to establish hydronephrosis of varying duration and then to decompress the hydronephrotic kidney by draining the dilated ureteral segment. Histological studies of the kidney and a few biochemical studies of the dog were made. Hydronephrosis was produced by surgical ligation of the left ureter near the ureterovesical junction, a segment of the ureter between two ligatures being excised to prevent recanalization. To provide drainage of the hydronephrotic kidney later, cutaneous ureterostomy, ureterocolic and ureteroureteral anastomoses were tried but were unsatisfactory. Implantation of the dilated ureter directly into the urinary bladder gave satisfactory results. The gross changes in the hydronephrotic kidney before drainage consisted of an increase in the perirenal fat, progressive pyelorenal enlargement depending on the duration of obstruction, gradual diminution in the depth of the surviving renal parenchyma, increase in the capacity of the pelvis, and stretching and elongation of the calyces.

Microscopically, the early changes were dilatation first of the collecting tubules and later of the convoluted tubules. Following this, degenerative changes were exhibited in the epithelium lining the tubules, occurring rapidly with changes of dilatation. Later the tubules disappeared completely and were replaced by fibrosis. The glomeruli first showed lobulation and hyalinization followed by fibrosis until they gradually disappeared. After ureterovesical implantation, the kidney shrank to a size smaller than that of the opposite kidney. Perirenal fat remained unaltered; the depth of the renal parenchyma almost approached the normal; and the calyces became thicker and shorter than normal while the corticomedullary differentiation, though not clear, reappeared. The microscopic changes, especially in kidneys obstructed for 21 days, consisted of the presence of a fair amount of renal cortex with larger number of glomeruli, and only a few areas of patchy atrophy of the collecting tubules in the medullary zone. Drained kidneys of longer duration showed more degenerative changes with little evidence of functioning renal parenchyma. The authors concluded that in the early stages, pelvic outlet of hydronephrosis had been through pyelovenous backflow, and at later stages, tubulovenous backflow.

NEW ZEALAND

Poison Pellet in Party Snapper.—Two boys were rushed to hospitals in two cities after eating a pellet containing metaldehyde found in a party snapper. The pellet was supposed to give off a miniature "snowstorm" when lit. In each case the pellet was labeled "poison" and was accompanied by a warning not to place it in the mouth, but young children

cannot be expected to understand this. It is most unwise of manufacturers to put poison of any kind inside a snapper. Almost equally dangerous were such articles as tiny rings, whistles, and charm bracelet trophies, which were also found in some snappers, as they could easily be swallowed by children.

Mental Deficiency Services.—In the December issue of the *New Zealand Medical Journal*, Dr. H. Bourne stated that the supply of institutional beds by the state does not constitute an adequate mental deficiency service. Only a small proportion of mental defectives ever reside in institutions. For the remainder certain special services are necessary. The staff of such services should detect cases of mental deficiency and help patients, their families, and their physicians to prevent breakdowns in social and occupational adjustment and the demands that may then arise for inpatient care, to supply after-care for discharged patients, and to assist with rehabilitating inpatients. Such services include psychiatric departments with mental deficiency and child guidance clinics in general hospitals; educational facilities; a register; nationally coordinated provision for the employment of disabled persons, whether crippled physically or mentally; and proper instruction of medical students in the nature of mental deficiency and the importance of this social problem, which, to some degree, affects over 2% of the population.

As yet nothing of this kind is found in New Zealand's mental health plans and policies. There are no community mental deficiency services, and such facilities as do exist are serviced by the education department, rather than by the health department, and by lay voluntary bodies, such as the Intellectually Handicapped Children's Parents' Association. For inpatient treatment a small fraction of the country's 11,000 mental hospital beds are used for mental defectives and those only in a custodial fashion, for the most part. If a start must be made with expenditure on beds, then, with the small and scattered population of this country, the dual functions of rehabilitation and easing the burden of the parents can only be obtained by establishing small and scattered institutions. Large institutions are suitable only for heavily populated areas. Small residential centers, closely linked to the community, where rehabilitation can be easily carried out are the solution to the problem. There is no reason why such centers should not be operated by the local hospital boards, rather than from the capital.

Bronchography in Children.—Morkane and Pryor (*Australian & New Zealand J. Surg.* 27:155, 1957) described a technique for apneic bronchography in children. The requirements to be met to conduct any anesthetic bronchoscopy and bronchography in children are avoidance of explosive agents, adequate oxygenation of the patient, some form of apneic technique to obtain clarity of pictures, removal of secretions, and a rapid return of the protective cough reflex. The problem is still more difficult in debilitated children. For children 1 to 6 years of age, rectally administered thiopental (20 mg. per pound of body weight) is given in the ward; and when the patient is asleep, 10 to 50 mg. of succinylcholine chloride is given and the lungs inflated gently with oxygen. The vocal cords and trachea are then sprayed with 2% lidocaine solution and the lungs reinflated. At the conclusion of the bronchoscopy another 10 to 15 mg. of succinylcholine is given and the patient again fully oxygenated. A special bronchography endotracheal tube is inserted and its position checked by screening. The portex tubes used are of varying sizes and they have a small vinyl portex side tube attached with vinyl portex cement. The side tubes carrying the opaque medium are joined to the convex surface of the endotracheal tubes for ease in introducing between the vocal cords. The patient is maintained with controlled respiration with a 2:1 mixture of nitrous oxide and oxygen on a semiopen circuit. Additional small increments of succinylcholine are given as required. This technique has the following advantages: only small amounts of dye are required to get good pictures and, since it is an apneic technique, there is no blurring of the picture due to chest movements during the exposure. Laryngeal spasm is particularly likely to occur after extubation due to the irritant effect of the secretions on the vocal cords, and the child should not be allowed to return to the ward until the anesthetist is satisfied that all danger of such spasm is past.

SPAIN

Medical Ethics.—Dr. J. A. Palanca, professor of hygiene of the University of Madrid and ex-general director of public health, at the inaugural session of the Deontologic Academy of Madrid said that the problem of medical ethics was part of the general problem of social ethics. Social ethics have long been under the control of the church. The medical profession, on the contrary, has lost its influence on the people because of the virtual disappearance of the family physician who in the past exerted a great influence on his patients. Specialists are no substitute for the family physician because their attention is centered on only one part of the patient and because they do not appreciate the small problems faced by their patients. Dr. Palanca said further that the necessity to make a living forces some physicians to look for more than one position. No physician can support his family on the income from only one position. There is no doubt though that certain abuses have arisen as a

result of this practice. These abuses should be dealt with within the profession. Regarding the competition for appointments on the faculties of universities, one of the gravest dangers is the use of political influence in obtaining such a position.

UNITED KINGDOM

World Medical Association.—The British Medical Association has set up a supporting group for the World Medical Association to increase interest in its work and to raise money for it. The B. M. A. makes an annual contribution of about $12,000 a year to the W. M. A., a contribution exceeded only by that of the American Medical Association.

Public Telecast of Operations.—The British Broadcasting Corporation is televising a series of weekly programs under the title of "Your Life in Their Hands," showing major surgical operations and procedures being performed in hospitals throughout the country. Most of these are live telecasts, and emphasis is being placed on the first-class surgical work that is done outside London. These are the first telecasts of this kind made for the general public. Among the topics shown are the radiologic treatment of cancer, cardiac operations, the surgical treatment of head injuries and tuberculosis, and the use of controlled respiration in surgery and in the treatment of respiratory paralysis resulting from poliomyelitis. Visits will be made by the television camera men to hospitals at Oxford, Manchester, Birmingham, Cardiff, Bristol, Glasgow, and Leeds. The B. B. C. states that the public have a genuine and not a morbid interest in disease, and that these telecasts are devised to satisfy this. The producer of the series has been careful to get all material approved by the hospital concerned and to obtain written permission for consent to appear from the patients concerned. General medical opinion is that such telecasts to an educated public cannot fail to do good, and that the chance of producing hypochondriacs by this means is small. Another view is that more people may consult their physicians earlier for the treatment of serious conditions if they see these telecasts. This would outweigh the possible disadvantage of visits to physicians for trivial or imaginary complaints.

Dietary Fat and Coronary Disease.—J. F. Brock (*Practitioner*, pp. 180-191, 1958) stated that for people who have already had a coronary thrombosis, who suffer from angina pectoris, or who have a strong family history of coronary disease, reduction of serum cholesterol levels in excess of the mean for age and sex is desirable if this can be achieved by simple dietary modification and that such reduction might improve the expectation of life and health in the person at risk. Further, the required modification can be made by adjusting the quantity or quality of fat in the diet without adversely affecting one's health in other respects. On the other hand, the situation is too uncertain to justify pronouncements by those who administer laws about food production and who control nutrition education. In the past, dietetics has been a rich field for quackery, and public health administrators are wise to avoid far-reaching recommendations until the case for action has been proved. No reliance should be placed on a single reading of the serum cholesterol level. The case for dietary modification must be judged in each case in relation to the trend of serum cholesterol readings and the estimate of the extent to which the patient is at risk of coronary occlusion. Restriction of fat should not be too strict. A reasonable objective is 30% of the caloric intake from fats. At this level weight can be maintained, and the palatability of the diet is not seriously impaired. There is no need to reduce cholesterol intake as such since there is no experimental or theoretical justification for believing that the cholesterol content of the average diet contributes materially to the level of serum cholesterol.

Laboratory Tuberculous Infection.—In 1957 Reid stated that over a five-year period 96 new cases of tuberculosis were reported in an average laboratory population of 4,824; on the basis of the age and sex distribution of that population only 36 new cases would have been expected. Of the observed laboratory population, about 10% of the men and 30% of the women had had no contact with tuberculous material, and among them the observed rate of infection was no higher than expected. This problem has been investigated by a working party, which has made a report to the Public Health Laboratory Service (*Monthly Bull. Ministry of Health*, vol. 17, 1958, p. 10). The purpose of the report is to indicate the dangers that accompany tuberculosis work in the laboratory so as to enable pathologists to take such precautions against them as seem desirable in the circumstances.

There are obvious advantages in removing potentially dangerous operations from the general laboratory but, unless the separate laboratory is of adequate size and well ventilated, the risk of infection to the person working in it may be greatly increased. The use of one particular bench in a large, common laboratory may be safer than partitioning off a tiny unventilated cubicle for examination of tuberculous material. Not all laboratory technicians are happy working on their own in a separate room, and there is a real danger that technique may become slipshod owing to lack of constant supervision by the pathologist and senior technicians. This disadvantage can be minimized by the provision of glazed partitions or observation windows be-

tween the separate tubercle room and the laboratory. Benches should have a smooth, impervious surface free from cracks that stands regular swabbing with Lysol. Contamination of the bench top from the outside of sputum containers and centrifuge tubes can be prevented by standing them in metal trays that can be sterilized by heat. Continuous irradiation of the upper air in the room with ultraviolet light is of doubtful value.

All new recruits, including clerical and maintenance staff, should have a tuberculin test on starting work in a laboratory where tuberculous material is handled. If the reaction is negative, vaccination with BCG should be offered, and the recruit should not be permitted to handle tuberculous material until the skin reaction has become positive. In some laboratories it would be justifiable to refuse to employ a tuberculin-negative person who refused BCG vaccination. All recruits should be x-rayed before employment. The frequency of subsequent x-ray examinations must be a compromise between the desire for the earliest possible knowledge of any radiologic evidence of infection and the risk of excessive radiation. An annual examination probably represents a fair compromise. Entirely untrained persons should not handle tuberculous material. In general, specimens should not be unpacked or handled by clerks or other persons untrained in laboratory technique. Should it be necessary for a clerk to unpack a specimen (for example, to determine to which of a number of laboratory departments it should be submitted), she should wear protective clothing and receive some elementary bacteriological instruction. Operating gowns fastened at the back should be worn. No mask less complex or uncomfortable than the service type gas mask will protect against the inhalation of infected particles. The operating mask of gauze and cellulose does protect against splashes and large droplets infecting the mouth and face in the autopsy room. Smoking when dealing with infected material, both in the laboratory and autopsy room, is dangerous and should be prohibited. Food and drink should not be consumed in the laboratory.

Prematurity and the Handicapped Child.—A study of the growth and development of premature and of full-term infants, which is entering its fourth year, indicates that although most prematurely born children, especially those weighing between 4.5 and 5.5 lb. (2,000 and 2,500 Gm.) at birth, attain to a physical and mental status approximating that of their full-term siblings, yet there remains a large excess of handicapped children in the premature group and a disproportionate number who are undersized and subject to constant illness, according to C. M. Drillien (*Health Bulletin*, vol. 16, 1958, p. 6). On the basis of the developmental quotient (the ratio of the mental age to the chronological age, allowing for the degree of prematurity), only 14 of 38 children between the ages of 2 and 5 years, who weighed less than 3 lb. (1,360 Gm.) at birth were graded as normal or superior; 13 were definitely dull, 7 were high-grade defectives; and 4 were low-grade defectives. A comparison of the average development quotients for four birthweight groups of children under the age of 3 years showed that it was 106 for those weighing over 5.8 lb. (2,630 Gm.) at birth, compared with 81 in those weighing less than 3.1 lb. (1,400 Gm.).

The incidence of severe physical abnormalities was much higher among premature children. Thus, of 23 severely handicapped children, only one weighed over 5.5 lb. (2,500 Gm.) at birth. Of the 54 children with a birth weight of under 3.9 lb. (1,770 Gm.) four had cerebral palsy, two had recurrent epileptiform convulsions, three had severe deafness, and one was blind due to retrolental fibroplasia. The number of children hospitalized in the first two years of life was twice as high in the premature group, and the total number of admissions was nearly three times as high in this group. Of medical conditions necessitating admission to hospital, bronchitis and pneumonia showed the biggest differential between the two groups. The incidence of children suffering from constant illness throughout the first two years of life was 20.4% among the premature, compared with 6.1% among the full-term. In the school-age group, a predisposition to lower respiratory infections persisting since infancy was reported in 12 of 29 patients for whom a reliable history could be obtained.

Blindness.—The total number of registered blind persons in England and Wales on Dec. 31, 1956, was 96,019 (40,803 males and 55,216 females), of whom 2,301 (2.4%) were under 16 and 79,766 (83%) were over 50. The statutory definition of blindness is being unable to perform any work for which eyesight is essential. This is generally interpreted as vision of 3/60 or less. Most registered blind have some degree of vision, and less than 5% of the newly registered are totally blind, that is to say, have no perception of light. The number of registered blind has been rising steadily for many years, the increase being most marked in the higher age groups. In 1955, 70% of all newly registered blind were 70 or over and almost half of these were 80 or over. The marked increase in the number of aged blind is largely accounted for by the increasing number of aged in the general population. The number of partially sighted persons on Dec. 31, 1956, was 20,329, of whom 7,957 were male and 12,372 female; 2,190 (11%) were under 16, and 14,645 (72%) were over 50.

Blindness due to such infections as ophthalmia neonatorum and syphilis has virtually disappeared, and the commonest causes of blindness among young children are congenital anomalies and retrolental fibroplasia. In older persons cataract, glau-

coma, and senile macular degeneration combined account for 80% of new registrations. New registrations in the persons between 16 and 65 show myopia, diabetes, and trauma as the most significant conditions. In a memorandum on the subject, the Ministry of Health describes as disquieting the fact that some 80% of persons registered as blind from cataract and some 40% of those registered as blind from glaucoma have had no treatment. Although there are more females than males on the register, trauma accounts for many more cases among men: 7 to 10 times as many men as women are blinded from accidents, principally in the active years.

Drugs for Athletes.—That there is no evidence whatsoever of drug addiction of any kind by athletes in this country was the opinion expressed by Sir Adolphe Abrahams in opening a discussion on the use and abuse of drugs by athletes organized recently by the Society for the Study of Addiction. The Amateur Athletic Association has issued a rule that drugs may not be used to produce better athletic performances and has asked the British Association of Sport to define what is a drug in this context. As Sir Adolphe pointed out, no reasonable person would object to tea and coffee, even though they contain caffein. Similarly, alcohol is a drug, but no one except ardent teetotallers would ban its use by athletes. Are we to refrain from the use of drugs that sharpen the appetite, improve digestion, and so contribute to physical well-being, or from a simple sedative to ensure a good night's sleep for an overanxious youngster on the eve of a contest? If amphetamine and cortisone can directly release another reserve of energy, are they not to be accepted as contributing to normal physiological well-being? There was no criticism of the use of oxygen in ascending Mount Everest. If it were practicable to construct a tunnel with oxygen-enriched atmosphere in which runners competed, record performances would be accomplished. Would this be approved? If not, what is the difference between climbing Mount Everest and beating any other record?

Action of the Sulfonylureas.—The sulfonylureas appear to decrease the hepatic output of glucose in patients with both stable and unstable diabetes, according to J. M. Stowers and co-workers (*Lancet* 1:278, 1958). Because insulin was not rendered more effective by carbutamide or tolbutamide, except possibly in patients in the fasting state, it was considered unlikely that these drugs inhibited the destruction of the insulin given. Although the patients with brittle diabetes studied were not of the type usually considered to respond to the sulfonylureas and fell into the category of diabetics probably lacking insulin of their own, both carbutamide and tolbutamide lowered fasting blood sugar levels in 6 of 11 patients and decreased variations in blood sugar level in 8 of 9. These actions were not thought to be due to any stimulus to production of insulin. It is admitted that the data presented did not exclude the possibility of a stimulus to the secretion of insulin, particularly if sulfonylureas were to have more effect on the action of insulin on the liver than elsewhere, but, on the other hand, no evidence was found to support this hypothesis.

Acute Respiratory Disease in Babies.—The Ministry of Health reported that since Jan. 20 there has been an increase in the number of babies needing hospitalization in London. Between 33 and 50% of all admissions arranged by the emergency bed service on account of acute respiratory disease has been for children under the age of 5, mostly for those between the ages of 3 months and 2 years. There has been no corresponding increased need for hospital beds for older patients. A similar situation was observed in Birmingham. The babies usually had a history of a progressive coryza with rapidly developing involvement of the lower respiratory tract. The more severely ill were restless and cyanotic, with intercostal recession on inspiration and other evidence of obstruction of the respiratory tract, but signs of consolidation were not prominent. A few deaths occurred. In many cases, oxygen therapy was required. Antibiotics had no effect on the course of the illness, although they may have helped to avert secondary infection. There was no evidence to suggest a bacterial cause. Similar outbreaks were reported in November, 1953, in London, Liverpool, Manchester, and Sunderland. Efforts to show that these were due to influenza or other viruses were unsuccessful, and the cause was never established.

Dermatitis in the Steel Industry.—An analysis was made by H. R. Vickers (*Brit. M. J.* 1:199, 1958) of the probable cause of dermatitis arising in 250 workmen employed in the steel industry, in whom the condition was thought to be due directly to their work and in whom the dermatitis was so severe that they had to be absent from work for at least three weeks. The largest group (34.8%) were incapacitated by dermatitis arising directly as a result of treatment of a relatively trivial injury such as a superficial burn or a small cut. The sensitizing agents most commonly used were acriflavine and its analogues and penicillin. In other cases various proprietary so-called antiseptics were responsible. In Vickers' opinion, the treatment of relatively trivial injuries should consist in the area being cleaned thoroughly with 1% cetrimide solution and either a sterile dry dressing or a dressing of sterile paraffin, the dressing not being disturbed until healing has taken place.

CORRESPONDENCE

REGULATING YOUR OWN FEE SCHEDULE

To the Editor:—It is possible to control your own fees, even though some of your patient's bills are paid for by welfare and rehabilitation state agencies, by union welfare plans, or by the Veteran's Administration in any type of hometown care program. This is simply a matter of proper billing.

Since time memorial, family physicians and specialists have been caring for marginal patient groups and for those who could pay nothing. At first, this was done voluntarily in the hometown private office, before there were welfare agencies. Later, some private physicians were accustomed to caring for indigent patients in clinics, usually associated with medical schools and public hospitals. The doctors usually rotated in staffing such clinics, to which they donated their services. This way of furnishing medical care to groups at a low economic level ran into trouble because some of the well-to-do were able to get by the social service screening into these free clinics. Most of these people were not "chiseling," but simply felt that the best medical care was usually associated with university and research centers. Such clinics usually had a teaching function.

In the last two decades, there has been a rapid increase in the number of public agencies who were responsible for clients requiring some form of medical care. Thus began the much publicized and talked about topic of the fixed fee schedules, which many fear are leading to some type of government control.

James L. Doenges, in a recent *Medical Economics* article (35:198 [Jan. 20] 1958) entitled "Fixed Fees Lead to Government Control," says: "As an independent practitioner, you doubtless abhor the thought of Government-controlled medicine. Yet each year more and more doctors accept fixed fees —both in principle and in practice. Since the fixed-fee concept is a keystone of Government medicine, America's physicians are playing right into the hands of those who advocate control." When you permit any outside source to fix your fees, this physician maintains, you are asking for trouble. Actually, many physicians cannot avoid doing work for the above-named agencies and such organizations as the Blue Shield under minimal rate schedules.

How are we going to maintain control of our own fees?

I have found a way of billing those from whom I have had to accept less than standard fees. In doing this, I have maintained my own fees by the simple expedient of billing at the rate of my regular charges, and listing as "courtesy" an amount that was obtained by subtracting the fixed agency fee from my regular charges. Thus, if I examine or treat a welfare patient for whom the public assistance department can only pay $10, whereas my specialist consultation fee is $25, the bill is typed out as follows:

County Welfare Department
County Seat
Pa.

For Professional Services Rendered $10

Bernie Jones

Consultation	$25
Courtesy	$15
Balance	$10

Payment received on.....

By following this procedure, the standard fees for the area are officially maintained. A well-to-do patient cannot feel that I have one scale of charges for the rich and one for the poor. This is especially important if one of my own private patients cannot afford to pay my regular fee. At the same time, I am maintaining my own fee schedule and in effect doing what the practitioners did years ago, doing charity work in their own offices. It is also self-evident that such a process of billing not only induces appreciation but also adds pressure to keep the fee rate at a reasonable level.

Why would it not be advisable for most physicians to bill in this manner? Hospitals, serving all economic levels and running clinics with staff physicians, could also, wisely, follow the same plan.

In these days, with the struggle to maintain adequate medical care and at the same time preserve the patient's free choice of his own physician, the medical profession needs to constantly and clearly interpret its position to the general public and agencies alike.

An economist once told our county medical society, "If you doctors don't arrange to distribute your services voluntarily, you deserve to be socialized with all its attendant evils."

There may be many ways to accomplish an objective, but usually the simplest method is the best. Doesn't the above illustrated manner of billing any fixed fee agency clearly portray the position of the average physician who is continuing to do his best to equitably distribute medical care?

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LAW DEPARTMENT

MEDICOLEGAL ABSTRACTS

The M'Naghten Rule and the Irresistible-Impulse Test.—The defendant was found guilty of murder. From the judgment of conviction, he appealed to the Supreme Court of Nevada.

One of the grounds of appeal related to the court's definition of insanity as a defense in a criminal action. Since 1889 the "right and wrong" test, patterned after the English M'Naghten rules, has been followed in Nevada. That test is: "To establish a defense on the ground of insanity, it must be clearly proved that at the time of committing the act the defendant was laboring under such a defect of reason, from disease of the mind, as not to know the nature and quality of the act he was doing, or, if he did know it, that he did not know he was doing what was wrong." The defendant attacked this test as unjust, unrealistic, scientifically false, and outmoded.

The right and wrong test, said the court, has been criticized from time to time ever since its announcement, but it continues to be followed in most jurisdictions. In this case, criticism was directed to the fact that the definition is set forth by rule. It is universally recognized, continued the court, that not every mental disorder should be regarded as sufficient to relieve one from criminal responsibility. So long as this be true it must be recognized that there are limits which may, in the public interest, be validly imposed upon the area within which the judgment of the jury and the psychiatrists can operate. In the interest of uniform administration of criminal justice it may reasonably be contended that these limits should be fixed as best they can and thus be made applicable in all cases.

To leave "insanity" undefined would be to eliminate the entire statutory concept of insanity as the limited and uniform basis for relief from criminal accountability. It would substitute in its place a jury power of moral judgment unlimited by those very bounds which statute law comtemplates and based solely upon the conscience and common sense of 12 persons. Such a sweeping change of approach, in disregard of limits and conditions comtemplated by statute, is, we feel, beyond the reach of the judicial function as that function is recognized in this state. In our view, said the court, the problem with which psychiatry and the law both are struggling should be judicially attacked upon the basis of agreement upon a test under which both law and psychiatry can best operate. Should the right and wrong test be modified by the irresistible-impulse test?

Among the psychiatrists themselves, said the court, there is much doubt as to the validity of the concept of irresistible impulse in the sense of a loss of volitional control through mental disorder that does not necessarily affect the intellectual powers of the defendant. In other words, the psychiatrists as a group apparently are not agreed that the urge to commit an act which one knows to be wrong can, through mental disorder, become irresistible. Further, there is doubt among the psychiatrists as to their ability to distinguish between those cases where lack of volitional control is properly attributable to mental illness and those where it is due simply to a failure to resist that which could have been resisted had the power to resist been exercised. It is felt that to recognize the irresistible-impulse test as an independent test of insanity without specific limitation, is to make the defense of insanity available to psychopaths and neurotics who ought not to be freed from accountability for their actions.

The court pointed out that a survey made by Dr. Guttmacher of members of the American Psychiatric Association indicated that 60% did not believe the concept of the irresistible impulse to be psychiatrically and legally sound.

With all the opposition to the M'Naghten rule, concluded the court, we must yet adhere to it until a rule can be substituted which more accurately reflects current scientific knowledge. We can hardly recognize as scientific truth a rule which has failed to receive the approval of what we may regard as the most enlightened segment of society in this field of knowledge.

The Supreme Court, therefore, held that the instructions given by the trial court on the question of insanity were correct. The judgment of conviction was reversed for other reasons, however. *Sollars v. State*, 316 P (2) 917 (Nevada, 1957)

Right to Read to Jury from Entries Made on Hospital Record.—This was an action for damages for the death of a patient from the alleged administration of an incompatible blood transfusion in the defendant hospital. From a judgment in favor of the defendant, the plaintiff appealed to the Supreme Court of Utah.

Ten days after an operation for the removal of a tumor, the plaintiff's wife died from an inflammation of the kidneys. The basic issues contested by the parties were: 1. Did the deceased receive an incompatible blood transfusion from which she died? 2. If so, was the defendant hospital negligent in connection with administering it, or in failing to stop it after an unfavorable reaction was noticed? The jury resolved these issues in favor of the defendant, but on appeal the plaintiff contended that the trial court had erred in its ruling upon some of the evidence submitted.

Two doctors, who had been called in consultation with reference to the treatment of the deceased, made certain entries in the hospital records. These notations were as follows: "Pelvic Laparoling 4-453 followed almost immediately by a chill and dark urine . . . This pt is going into some type of renal decompensation possible on the basis of a transfusion reaction . . ." Signed "V. L. Rees." And at the bottom of the same page of the progress

notes: "This is undoubtedly a Lower Nephrone Syndrome from hemolytic Blood Transfusion . . ." Signed "KAC"

These entries obviously had a direct bearing upon the question of whether or not the deceased had received a transfusion of incompatible blood which had caused her death, and the attorney for the plaintiff wanted to read them to the jury and comment upon them in his argument. The trial court allowed the defendant's objections to such procedure.

The surgeon who had performed the operation on the plaintiff's wife testified at the trial that in his opinion the patient probably died as a result of a blood transfusion reaction. The hospital pathologist, however, refused to concede that there was any definite proof that such a reaction had even occurred. The hospital entries, therefore, had a direct bearing on a critical and disputed issue.

The defendant hospital contended that since the doctors who made the notations were not employees of the hospital, such entries were neither admissible nor binding upon it. The Supreme Court of Utah admitted such rulings in other states but said that it adhered to the view that admits evidence of the character here in question notwithstanding the fact that it represents in part doctors' opinions as to the patient's condition. The notations were recorded as information deemed pertinent to the patient's care and treatment by persons performing duties in that regard. We have heretofore recognized, said the court, that the entering of data on hospital records by personnel so engaged carries sufficient guarantees of trustworthiness to render them admissible in evidence and worthy of consideration by the fact finder in connection with the other evidence in the case. The doctors attending the plaintiff's wife come within such classification, and entries they made upon the hospital record in connection with their duties in rendering medical service to this patient are competent evidence to be considered for such purpose.

The defendant further contended that, assuming the notations are competent evidence, it was nevertheless but harmless error for the trial court to sustain his objection to their being read and argued to the jury because the records had actually been received in evidence and were there for the jury to read if it so desired. The Supreme Court conceded that the records were there for the jury to read but pointed out that such records were couched in such terms that they could stand some elaboration for the benefit of those uninitiated in the mysteries of medical terminology. This emphasizes the importance of according the plaintiff's counsel the opportunity of performing one of his essential functions: that of arguing his cause to the jury. In doing so, he should be permitted to refer to and use all of the competent evidence he has marshalled and presented in the trial, and to explain its meaning and argue its significance to the jury. Some indication of the importance of the error with which we are here concerned, added the court, is to be found in the fact that the counsel for the defendant thought the matter of sufficient consequence that he objected to the reading and use of the evidence in the argument to the jury. The court felt that it was somewhat inconsistent that counsel now urges that depriving the plaintiff of the use of such evidence was merely harmless error. If it is so plain that it would not have helped the plaintiff's case, one is led to wonder why the counsel made the objection and insisted that it not be used. The obvious answer seems to be that the defendant's counsel was apprehensive that it may have a substantial effect against his client.

In view of the fact that there is such substantial doubt that we cannot, with any degree of assurance, affirm that the use of such evidence would not have been helpful to the plaintiff, the doubt should be resolved in favor of allowing him to have a full and fair presentation of his cause to the jury.

The judgment of the trial court in favor of the defendant hospital was therefore reversed, and the case was remanded for a new trial. *Joseph* v. *W. H. Groves* Latter Day Saints Hospital, 318 P(2) 330 (Utah, 1957)

THE LEISURE CORNER

AUTO CAMPING

The relatively recent development of public auto camp grounds, equipped with modern conveniences, provides a background of vacation fun. These are usually located in scenic beach and forest areas and operated under state and federal jurisdiction. Auto camping will prove especially attractive to doctors who prefer this type of camping to "roughing" it, since it lends itself to an easygoing, healthful experience with many of the comforts of home.

Everywhere throughout our country public parks and forests are extant in which one can camp in various degrees of comfort and where facilities for recreation have been organized for every member of one's family. These camping grounds are usually free of charge; others assess a nominal fee.

Camping as such is not new on the American scene. Its popularity has skyrocketed among family groups since the end of World War II. The organization of camp grounds with modern facilities has taken all the hardships out of camping. In most parks modern toilets and washrooms are within easy reach from the spot on which you pitch your tent. Water hydrants and faucets are provided with safe drinking water available. The basic necessities for a pleasant vacation stay are always on tap.

It will interest you to note how readily, in this type of environment, you can become accustomed to living in a tent. Since campers go into the woods to be out of doors, to cook, eat, and enjoy activities in the open air, tents by themselves are merely an

adjunct, handy for shelter or as a source of privacy, essential in case of rain, and conveniently portable. Solitude need not be endured unless there is a deliberate attempt to seek out remote camp sites. For the gregarious person a small tent community acts as a magnet. Campers as a rule not only are gregarious if offered any encouragement but also will respect privacy.

Housekeeping in a camp is simpler than at home, provided an effort is made to avoid accumulating a lot of gadgets and unessential equipment. If sleeping close to the ground in a sleeping bag has no appeal, there are aluminum folding cots to be had, and air mattresses for sound sleep.

Many camping doctors have found that the out-of-doors life seems to slow down the clock. Life is completely unhurried and items hitherto regarded as conveniences are quite unnecessary, especially since their only virtue in the first place was a slight saving of time in the hustle and bustle of city life.

As for the fear of wild life, it is known that no wild animal will deliberately attack a human being. The forest is no menace to those who take a little time to become acquainted with the many fascinating aspects of its quirks and peculiarities.

As a rule, a beginner in the art of auto camping should start off with a week-end camping trip. State parks are best for short-term camping. They are convenient to reach, are plentiful in number in many states, and seldom require more than an hour or two of driving. Camping grounds are well marked, planned for maximum comfort, and insure a proper amount of exclusiveness in combination with convenient accessibility to the center of activities. After you have chosen a camp ground in a public area which offers the potentialities of greatest interest to you and your family, the next important consideration is the selection of equipment. By far the most important item is that of shelter.

There are many different types of tents, ranging from a simple army tent to an elaborate bungalow tent. The choice depends largely upon one's purse and the degree of comfort sought. The umbrella tent is easy to erect and involves pegging down four corners and then lifting it up on its rib frame. The cost of a good umbrella tent ranges anywhere from $40 to $100, depending on the number of persons to be sheltered. The pup tent is a "crawl-in" type, oblong, and sloping in an "A" shape from center poles at either end to a height of about 4 ft. It can be erected in a few minutes, may cost as much as $30, and can be purchased at any Army goods store.

Bedding is an equally important item. Sleeping bags, lined top and bottom with kapok or wool, are very desirable. Fancy arctic bags may prove to be too hot for summer; on the other hand, cheap cotton batting lumps up and lacks warmth for cool nights. First-aid kits are always taken along for possible emergencies; if the doctor itinerant runs true to habit he will invariably take along his entire medical bag. In general, the total cost of equipment usually required for a traveling camp will range anywhere between $150 and $275 for a family of four. The weight should average from 200 to 300 lb.

If you camp in state parks, the resident custodian can offer helpful advice on the scenic spots of the area. He will direct you to the best fishing places and suggest the most picturesque animal and bird sanctuaries. If you decide on forest camping, you will find the National Forest Service men ready to help you enjoy your visit. No matter how busy they may be with the task of conservation and supervision of commercial operations, they always find time to answer questions patiently or assist in an emergency; all of this is done with a genuine personal interest and extreme courtesy. Forest Service men are a guarantee that a camping trip in national forests will prove most enjoyable.

Auto camping, like any other specialized form of activity, has its code of ethics. Most people who go camping have little trouble adjusting to the circumstances characterizing outdoor community life. It is always wise to select a camp site with due regard to the privacy of one's neighbors. Drive your car into the designated parking space and maintain the grounds as close to their natural state as possible. Remember to preserve the same modesty of behavior that is appreciated at home, dress in the privacy of your shelter, and wear an adequate amount of clothing.

The "Motorist's Guide to Public Playgrounds" is intended to provide essential information concerning every public area in which camping is permitted and in which camp grounds are accessible by automobile. The "Guide" lists all the basic data you will need in planning a camping vacation. The following definitions are an example of a key to camping facilities:

Primitive: Facilities either inadequate or nonexistent. Family camping possible, but not advised.

Permitted: Lacking one or more of the following facilities—table, fire grate, readily accessible water supply—but always equipped with toilets. This designation is also applied where picnic grounds permit camping but prefer not to encourage it.

Developed: Scientifically developed for camping and providing at least a table, fire grate, toilets, and readily accessible water supply.

Highly developed: Providing laundry and shower facilities in addition to basic requirements of a developed camp ground. Often includes flush toilets, electric outlets, cooking shelters, tent platforms, and food storage facilities.

If you and your family wish to see America more intimately and enjoy all its loveliness with a minimum of cost, then gather your group, carefully plan your equipment, pick your vacation spot, and merrily take to the highway.

MEDICAL LITERATURE ABSTRACTS

INTERNAL MEDICINE

Fever, Infection and Host Resistance in Acute Leukemia. R. T. Silver, J. P. Utz, E. Frei and N. B. McCullough. Am. J. Med. 24:25-39 (Jan.) 1958 [New York].

The authors report on 19 children and 17 adults, 18 male and 18 female patients, with acute leukemia. Fever and infection were studied with comprehensive bacterial, fungal, and viral techniques. The average period of observation was 72.6 days. As a group, these 36 patients were febrile for 1,162 (44.5%) of the total of 2,614 days of observation. Only 2 patients had no febrile episodes during the period of observation. Fifty-nine of the recorded 92 febrile episodes appeared to be related to infection. Bacterial, viral, or fungal infection could not be determined as a cause of fever in the remaining 33 febrile episodes. Age and type of leukemia did not significantly affect the rate of febrile episodes. However, more febrile episodes related to proved or presumptive infection occurred in adults than in children. Pharyngitis, pyelonephritis, and septicemia were the most common clinical illnesses associated with the proved infection. Occasionally, relatively avirulent bacteria were capable of causing serious clinical infection. The most frequently observed organisms were Escherichia coli, Micrococcus pyogenes var. aureus (coagulase positive), and Pseudomonas aeruginosa. Infections caused by Ps. aeruginosa were the most difficult to treat.

At the conclusion of the observation period, 14 of the 36 patients were dead. Ten (71.4%) of these died with overwhelming infection. Survival after infection was common, in the absence of bacteremia, if intensive and appropriate antimicrobial therapy was employed. Most of the febrile episodes in the 15 patients with presumptive infections were related to pneumonia and other infections of the respiratory tract. From the standpoint of patient care, it is to be emphasized that the initial absence of a focus of infection on physical examination does not rule out infection as a cause of fever in acute leukemia. Although the development of an infection in a patient with a fever of undetermined origin was not infrequently heralded by a qualitative or quantitative change in the temperature pattern, there was no reliable method for excluding the possibility of infection other than laboratory studies, particularly blood cultures and chest roentgenograms. Of 14 febrile episodes of undetermined origin which persisted after 2 weeks of antibiotic therapy, 8 eventually terminated in serious bacterial infection. Appropriate management for persistent fever of undetermined origin requires continual reappraisal to insure that a superimposed infection, masked by preceding unexplained fever, has been detected.

The Transbronchial Measurement of Left Atrial Pressures in Mitral Stenosis and Insufficiency. M. Rubin and S. Shah. Am. Heart J. 55:55-65 (Jan.) 1958 [St. Louis].

Left atrial pressure tracings were obtained with the transbronchoscopic method in a consecutive series of 56 patients with mitral valvular disease in whom topical anesthesia was produced with a mixture of 10% cocaine hydrochloride and 2% tetracaine (Pontocaine) hydrochloride solution. The procedure proved to be simple and relatively safe. There were no serious complications as a result of bleeding or infection caused by the needle puncture of the bronchus and the left atrium. Peripheral embolization occurred in 1 patient. Fatal ventricular fibrillation occurred in 1 patient after topical anesthesia of the tracheobronchial mucosa; the death was attributed to a cocaine reaction.

The atrial pressure tracings were satisfactory in 42 of the 56 patients. A diagnosis of predominant mitral stenosis was made from the tracings in 19 of the 42 patients, and 14 of the 19 were treated surgically. Mitral stenosis, as evidenced by fused mitral cusps and a small mitral orifice, was noted in 13 of the 14 patients. There were 18 patients with left atrial pressure tracings compatible with predominant mitral insufficiency; all but 4 of these tracings were obtained from patients with atrial fibrillation. The clinical findings in these patients were those of mitral insufficiency. The left atrial pressure tracings thus were found to be clinically reliable in distinguishing predominant mitral stenosis from insufficiency. Small degrees of insufficiency in patients with predominant mitral stenosis

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may not be detected by means of atrial pressure tracings. In the presence of atrial fibrillation, mitral valve incompetency may be augmented as a result of the cardiac arrhythmia and this may produce an exaggerated insufficiency pattern.

Pulmonary Sclerosis Due to Tabagism. N. G. Lupu and C. Velican. Presse méd. 65:2184-2187 (Dec. 25) 1957 (In French) [Paris].

Guinea pigs were subjected to the inhalation of the smoke of half a cigarette within a quarter of an hour daily for periods up to 6 months, and rabbits were subjected to the same procedure for periods up to 16 months. Microscopic examination of the lungs of the animals which were killed at various intervals during the periods of tobacco inhalation revealed a progressive process of pulmonary sclerosis in all of the animals. The histamine level in the lungs of the animals increased from 30 mcg. per 1 Gm. of lung tissue in the normal animal to 104.48 mcg. after 90 inhalations. These findings suggested that pulmonary sclerosis caused by the inhalation of excessive tobacco smoke is in reality a histamine sclerosis. In an attempt to elucidate this problem, the animals were given an injection of 0.001 Gm. of promethazine (Phenergan), an antihistamine agent, 30 minutes before each tobacco inhalation. This procedure resulted in a subnormal level of 19.20 mcg. of histamine per 1 Gm. of lung tissue after 90 inhalations and prevented or notably delayed the development of sclerotic changes in the lung.

Radiologic, spirometric, hematological, and biochemical examinations which were performed on 20,000 hospitalized patients with various diseases revealed the presence of pulmonary sclerosis in 9.5% of these patients, independently of whether they were heavy smokers. Pulmonary sclerosis, however, was observed in 57% of the heavy smokers. Pulmonary sclerosis caused by excessive tobacco smoking should be classified among the nonoccupational pneumoconioses, which include all types of pulmonary fibrosis produced by the sclerogenous action of smoke and dust outside of an industrial environment.

Spontaneous Remission in Pernicious Anemia: Report of a Case. K. R. Tanaka and G. O. Clifford. New England J. Med. 258:7-12 (Jan. 2) 1958 [Boston].

Investigation of the record of a 48-year-old woman who, in October, 1956, was admitted to a Detroit hospital because of progressive increase in the size of her abdomen and swelling of her lower extremities revealed that in 1947 she had been treated for Addison's pernicious anemia. The diagnosis of pernicious anemia seemed warranted by the finding of pancytopenia with macrocytic anemia, a megaloblastic bone marrow, gastric achlorhydria, and a characteristic and complete response to refined liver extract. It is unfortunate that intrinsic-factor activity was not assayed in 1947. In the absence of such tests it must be acknowledged that certain other causes of megaloblastic anemia must be considered, but the author shows that these could be ruled out. In 1956, 9 years after the demonstration of pernicious anemia, repeated measurement of the intrinsic-factor activity by the Schilling test revealed adequate amounts of this substance. It is suggested that intrinsic-factor activity, though absent for a long time in some persons, may not necessarily be permanently absent. The authors believe that, in any large group of patients with Addison's pernicious anemia receiving lifelong therapy, an occasional patient similar to the one presented may spontaneously regain intrinsic-factor activity so that therapy is no longer necessary. A long-term survey is now in progress to determine this possibility.

Systemic Scleroderma with Portal Hypertension. R. J. Calvert, B. Barling, M. Sopher and M. Feiwel. Brit. M. J. 2:22-25 (Jan. 4) 1958 [London].

The authors report 2 cases of systemic scleroderma associated with hepatic fibrosis, one in a 31-year-old woman and one in a 53-year-old woman. The salient feature in both patients was portal hypertension resulting in esophageal varices which led to recurrent hematemesis, an aspect apparently not previously described. The younger patient survived a palliative subcardiac portoazygos disconnection by gastric transection combined with splenectomy and was well 5 years later with no subsequent hematemesis. The second patient, whose illness was further complicated by a combination of sclerodermatous hemorrhagic colitis and steatorrhea, was treated conservatively for recurrent hematemesis and melena. After prolonged invalidism, she died in coma as a result of hemorrhage from an esophageal varix 20 months after her first episode of hematemesis.

The hepatic fibrosis observed at operation in the first patient defies ready explanation, since there was no evidence of malnutrition, previous hepatic or biliary disease, generalized passive venous congestion, small intestinal defect, or ulcerative colitis. Though not subject to proof, it may have been a direct manifestation of the visceral sclerodermatous process. Microscopic examination of the operative splenic specimen in the first patient and examination of the spleen of the second patient at autopsy revealed congestive splenomegaly. Hepatosplenomegaly associated with scleroderma has been reported by other workers. Occasional hepatic fibrosis is a recognized sequel of congestive hepatomegaly from cardiac and pulmonary scleroderma and might also be expected to occur in some patients with sclerodermatous

hemorrhagic colitis, especially if there is concomitant steatorrhea, as occurred in the second patient. It is, however, admitted that the hepatic fibrosis and its complications in both patients might have been independent of the scleromatous process. The possibility of the presence of esophageal varices, as observed in these patients, should be entertained in the course of the standard radiologic studies of visceral scleroderma.

Boeck's Sarcoid in Two Brothers. H. Waagø. Nord. med. 58:1494-1495 (Oct. 3) 1957 (In Norwegian) [Stockholm].

Boeck's sarcoid appeared at the same time in 2 brothers, aged 43 and 37 years, who lived near each other. The author suggests that, since Boeck's sarcoid may occur without any symptoms, a more systematic search among the relatives of patients with the disease may reveal a greater frequency of Boeck's sarcoid than hitherto known.

Oral Treatment of Diabetes: Primary and Late Results in Material of 200 Cases. A. Edlén, L. Hermansson and S. Strandquist. Nord. med. 1659-1662 (Oct. 31) 1957 (In Swedish) [Stockholm].

Of 200 patients orally treated for diabetes together with a restricted carbohydrate diet, 120 had previously been treated with insulin. Carbutamide (BZ-55) was given in 160 cases and D-860 in 40; no special difference in result was noted. The average age of the men was 62 and of the women, 65. One hundred sixty patients were observed for 6 to 14 months, and of the rest only 5 were observed for less than 2 months. Only 38 had had diabetes for less than 1 year. In 58 of the 77 men and in 97 of the 123 women the primary reaction to orally administered treatment was favorable. The shorter the duration of the diabetes, the better the primary result, but a good result is not excluded even in patients with diabetes of long standing. Previous insulin treatment does not exclude a good result of orally given treatment, but the absence of insulin treatment substantially improves the possibilities. An insulin requirement of a dose of more than 40 international units is considered prognostically unfavorable in judging the possibility of successful tablet treatment. Complications of treatment were observed in 13 cases. Hypoglycemic symptoms, seen in 8 patients, disappeared on decreased tablet dosage. After a shorter or longer time some patients responded increasingly less well to the orally given treatment. No external cause for the lessened effect could be found. In nearly all of these patients increased dosage, change of preparations, and stricter diet were without avail. After orally given treatment for 2 to 12 months, it had to be replaced with insulin therapy in 28 patients, of whom 23 had had insulin treatment previously.

SURGERY

Malignant Lymphoma of the Thyroid. J. W. Welch, V. E. Chesky and C. A. Hellwig. Surg. Gynec. & Obst. 106:70-76 (Jan.) 1958 [Chicago].

The material for this study was obtained from 215 cases of malignant neoplasms of the thyroid removed surgically and examined microscopically at the Hertzler Clinic in the 15-year period between 1940 and 1955. Four of these cases proved to be sarcoma originating in the thyroid gland, an incidence of 1.8%. The 5th case presented all the clinical features and followed a typical clinical course of thyroid lymphoma but proved to be a nodular goiter with leukemic infiltration of the thyroid. Four of the 5 patients were operated on, and in the 5th patient a specimen was obtained at autopsy. All except the 2 most recent patients died within the 3-month period after surgery and irradiation treatment. The last 2 patients received roentgen therapy after surgery with dramatic relief and are at present clinically well. The authors also review data on 76 cases collected from the literature of the past 30 years. The signs and symptoms of this disease have been constant enough to present a syndrome. The patients were predominantly elderly women (average age 60 years) who developed rapid enlargement of the neck, with or without preexisting goiter, accompanied by a tight feeling in the neck with dyspnea, dysphagia, weakness, weight loss, and often hoarseness. After thyroidectomy and x-ray therapy, the patients experienced marked relief of symptoms and became clinically well for a brief period, but then the disease followed a rapidly fatal course within 4 to 6 months. The authors call attention to the difficulty of distinguishing thyroid sarcoma.

Such features as a diffuse, single-cell infiltration versus a sheet-like cell arrangement, absence or presence of reticulum, and the occurrence of or lack of intimal infiltration aid the pathologist in distinguishing round-cell carcinoma and lymphosarcoma, but ultimately it becomes a matter of judgment and experience in pathological interpretation. The decision as to whether a thyroid is invaded by lymphoma primarily or secondarily is again a matter of judgment based on clinical history and gross pathology, as well as on the microscopic findings. There are no clear-cut, infallible criteria for classification of these tumors. Distinguishing struma lymphomatosa from lymphosarcoma is no problem for the trained microscopist, but the question of whether the lymphosarcoma originates in the struma lymphomatosa is again controversial. The coexistence of lymphosarcoma and struma lymphomatosa is not infrequently mentioned in the literature; there were 2 such cases in this series. It is believed that primary thyroid lymphoma arises from preexisting lymphoid tissue present in the gland as a result of inflammation.

Secondary Haemorrhage Complicating Gastrectomy. J. Littler. Brit. J. Surg. 45:277-280 (Nov.) 1957 [Bristol].

The development of ulceration in the region of the stoma after gastrectomy of the Polya type has been performed may be surprisingly early and may produce bleeding before the patient leaves the hospital. In the 3 patients described, repeated serious episodes of bleeding, occurring 10-20 days after partial gastrectomy was done, were preceded by a well-defined chain of symptoms and signs. The bleeding in these patients probably was a secondary hemorrhage. A possible explanation of its cause lies in the development of sepsis in and around the gastrojejunostomy suture line, with the production of submucous abscesses and consequent erosion of thrombus and of blood-vessel walls in the vicinity by proteolytic ferments. In 1 of the 3 patients it was likely that a perigastric abscess developed, and this may have played a major part in the causation of the bleeding. These patients were repeatedly placed in jeopardy by profuse hemorrhages and were only saved by energetic treatment. In none of these patients was exploration of the abdomen undertaken during the bleeding phase, though it was seriously considered in 2. These patients could not have derived any benefit from an operation, since the surgeon would have been obliged to take down a recently fashioned anastomosis and would probably have been faced with a gross degree of sepsis in the submucous coats of the stomach or jejunum or both in a patient in a poor condition. The only chance of survival for these patients seems to be careful watching, particularly of temperature and systolic blood pressure. It is important to realize that serious bleeding may occur and yet not appear as a hematemesis in these cases.

The use of broad-spectrum antibiotics and sulfonamides is necessary because the nature of the infecting organism is not known. Antibiotics and sulfonamides were not given as early as they might have been because the gravity of the situation was not realized until serious hemorrhages had occurred. These patients are best treated with an indwelling Ryle's tube. The stomach contents should be aspirated every hour, since the appearance of fresh blood in the syringe will often be the first warning of another massive hemorrhage, and resuscitative measures can be taken at once. A small, measured quantity of water can be given orally each hour, but the main fluid intake must be by the intravenous route. Morphine should be prescribed liberally to allay the acute anxiety engendered in the mind of the patient by repeated episodes of serious bleeding. Large quantities of compatible blood must be available. Two of the patients reported on received 20 pints of blood during the bleeding phase. The prognosis is good if the patient can be kept alive by the use of chemotherapy, antibiotics, and transfusions when necessary until the infection has been overcome. The 3 patients made satisfactory progress and remained free from further complications.

Experiences with Arterial Grafting for Major Arterial Occlusive Disease. H. R. Butcher Jr. and J. R. Robinson. Am. J. Surg. 95:25-30 (Jan.) 1958 [New York].

The authors performed arterial reconstitutions in 45 men and 15 women between 31 and 80 years of age. Twenty-six of the 60 patients had aortic bifurcation homografts implanted, and 34 had femoral artery grafts. Nineteen of the 26 patients had symptomatic arteriosclerotic occlusion, 6 had abdominal aneurysm, and 1 had an unrecognized dissecting aneurysm. Five of the 26 patients died postoperatively, 4 had late thrombosis of the grafted vessel, and 2 died of vascular disease in the course of follow-up. The remaining 15 of the 26 patients were alive with open grafts, but only 12 of these were significantly benefited from their operations.

The group of 34 patients underwent grafting operations for correction of blood-flow deficiencies associated with occlusions of the iliofemoral arterial system below the bifurcation of the common iliac and above the distal popliteal arteries. Nineteen of the 34 patients had femoral artery homografts implanted; postoperative thrombosis of the graft occurred in 7, 5 had serious later complications, and 7 had patent, fuctioning grafts. Equine carotid arterial heterografts treated by controlled peptic proteolysis were used in the remaining 16 patients of this group; postoperative thrombosis of the graft and early graft failures occurred in 7 patients, and late complications, such as graft failures, thrombosis of graft, and formation of aneurysm in the graft, occurred in the other 9 patients. The use of this type of graft in man is contraindicated.

Surgical Management of Chronic Ulcerative Colitis. W. S. Carpenter and P. J. Connolly. A. M. A. Arch. Surg. 76:13-19 (Jan.) 1958 [Chicago].

Although medical treatment, in some patients combined with psychotherapy, has been effective in controlling chronic ulcerative colitis in 50% to 80% of patients, in others some form of surgery has been necessary to eradicate the disease. During the past 7 years the authors treated surgically 33 such patients. In the fulminating form of colitis, the procedure of choice is colectomy to the low sigmoid with ileostomy. In elective cases with diffuse disease, the one-stage proctocolectomy is preferred. In segmental disease a less extensive procedure may suffice. Three of the 33 patients are now dead. One was a man who had abdominal carcinomatosis when first seen. The second, seen

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post partum, was a 21-year-old woman who had a fulminating attack when an ileostomy was performed. Thrombosis of the aorta developed 11 days after operation. The third was a 22-year-old woman who had been in the fulminating toxic phase, with a temperature reaching as high as 105 F (40.5 C), for 2 months and who had been treated with corticotropin and cortisone for 4 weeks before operation. Among the 30 patients who were subjected to colectomy, there was 1 death.

One or more complications directly related to the surgical intervention occurred in 11 patients. The major problem was stenosis of the ileostomy, both early and late. Despite all precautions, the incidence of stenosis was high. Only 17 of 28 patients surviving the ileostomy had no trouble with the ileostomy. In 1 patient multiple furuncles developed about the site of ileostomy several months after operation. The other 10 patients had stenosis requiring revision. Seven patients had a single revision, but the other 3 had up to 6 revisions. In spite of the ileostomy problems, however, the end-results of total colectomy for ulcerative colitis were gratifying. Physical improvement was demonstrated by gain in weight in nearly all of the patients. The results from the social standpoint were as good. All survivors, except one with a mental disease, returned to normal physical activities, which included bowling, golf, dancing, swimming, horseback riding, and water skiing. The economic improvement is demonstrated by the fact that nearly all patients returned to the same occupation as before surgery. The improvement in the mental symptoms was remarkable in many patients.

The Results of Treatment of Slipped Femoral Epiphysis. J. E. Hall. J. Bone & Joint Surg. **39-B:** 659-673 (Nov.) 1957 [London].

In 1950, a subcommittee of the British Orthopaedic Association was formed for the study of slipped femoral epiphysis. Drawn from many centers, the material is heterogeneous and represents a random sample of the results in the United Kingdom in recent years. In 35 of the 138 patients reviewed both hips were involved, a total of 173 hips. In 82.8% of the patients, more than 4 years had elapsed since the beginning of the treatment. Shepherd's method of assessing the results of arthroplasty operations was adapted. Satisfactory results were found in 77.9% of all patients. The value of straight longitudinal traction is questioned. Medial rotation appears to be an essential step in the reduction of the deformity. Manipulation was found to be a relatively safe and effective method of reducing the deformity in patients seen soon after an acute episode and should be reserved for them. Complications were common after nailing operations and included subtrochanteric fracture in 3 cases.

Smith-Petersen nails or other large trifin nails were used on 84 occasions, 36 times after cervical osteotomy and 48 times either as primary treatment or after a period of traction or a manipulation. The results were generally satisfactory, but complications were found in a surprisingly large number of patients. In the cases of nailing without any direct attack on the femoral neck, there were 5 examples of avascular necrosis. In each of these cases some other factor must share responsibility with the Smith-Petersen nail. It may be that the added trauma of driving a large nail into the femoral head may be enough to abolish completely an already precarious blood supply. Moore's pins or other slender multiple pins were as effective as Smith-Petersen nails in preventing slipping or maintaining reduction, and their use was seldom followed by complications. They were employed 20 times with no complication except erosion of 2 pins. However, the patients treated with Moore's pins were under observation for an average of only 21.6 months, compared with 67.7 months for those treated with Smith-Petersen nails. It may be that avascular necrosis will eventually be evident in some of these patients, 8 of whom had had successful manipulations. Avascular necrosis was the commonest cause of a poor result. It was found in 37% of cases in which a manipulation was followed by a nailing operation and in 16 of 42 patients subjected to cervical osteotomy.

Clinical Experiences with Pheochromocytoma. E. M. Lance, W. B. Cate Jr., G. W. Liddle and H. W. Scott Jr. Surg. Gynec. & Obst. **106:**25-37 (Jan.) 1958 [Chicago].

Twelve instances of pheochromocytoma have been recorded in the past 4 years at the hospitals of Vanderbilt University in Nashville, Tenn. The incidence has been variously determined at 0.4 to 2% of all hypertensive patients, but some investigators believe the actual incidence to be higher. These patients have potentially curable hypertension, and failure to recognize and treat their disease is lamentable. This report is concerned with 9 of the 12 patients. A higher index of suspicion, with a more efficient use of diagnostic aids, is necessary if the cure rate of this group of potentially curable hypertensive patients is to be raised. The manifestations are paroxysmal in nature, but this may be expected in only slightly more than 50% of the patients. Hypermetabolism is usually, but not necessarily, clinically apparent. Indirect pharmacological tests aimed at altering the effects of the circulating vasopressor substances produced by the tumor have been the principal methods of confirming the clinical diagnosis since 1945. Estimation of urinary catechol amines should supplement and may eventually supersede the indirect tests in confirming the clinical diagnosis, since the direct

method is safe and is potentially more accurate. Pheochromocytoma is a treacherous tumor. In untreated patients death usually results from cerebral hemorrhage, myocardial infarction, or pulmonary edema. Surgical treatment should not be delayed.

There have been no deaths in the present series when definitive surgery for preoperatively recognized pheochromocytoma has been carried out. The authors believe that the reported operative mortality rate of 15 to 20% will be lowered in the future. Reports indicate a 50% mortality rate in patients who harbor a pheochromocytoma and are subjected to unrelated major surgical procedures. The surgical treatment of pheochromocytoma should, therefore, take precedence over the treatment of other coexisting conditions except in emergencies. Anesthesia must permit rapid induction, adequate oxygenation, and relaxation with minimal vasomotor alterations. These aims can be accomplished by sodium pentothal induction with nitrous oxide, ether, and oxygen maintenance. The surgical approach providing best exposure of the tumor is a thoracoabdominal one. When the location of the tumor is not known with certainty, an initial abdominal incision should be planned so as to permit its conversion into a thoracoabdominal exposure after the tumor has been localized and the search for multiple foci of tumor formation completed. Gentle handling of the tumor during its removal and the availability and intelligent use of blood pressure regulating drugs are essential.

Treatment of Fractures of the Os Calcis. M. H. Leonard. A. M. A. Arch. Surg. **75**:990-997 (Dec.) 1957 [Chicago].

Thorough roentgenography is essential in fractures of the heel bone (os calcis). An anteroposterior view of the ankle will demonstrate the possible piling up of bone of the os calcis under the fibular malleolus. Other exposures are a lateral view of the ankle and foot, an anteroposterior view of the foot to demonstrate possible involvement of the calcaneocuboid joint, and an axial view of the heel. The axial view presents the greatest difficulty in that the central ray must pass tangentially through the subastragalar joint. This can be done either with the patient standing and the central ray passing from the back of the heel toward the sole or with the patient recumbent and the central ray passing from the sole to the back of the heel. Mild fragmentation of the tuber of the os calcis without joint involvement can be treated by brief plaster immobilization. The usual routine with patients who do not require operative intervention is to immobilize the foot and ankle in a short-leg cast for 3 to 6 weeks, followed by non-weight-bearing, mobilizing activities and then free weight-bearing in a shoe which is appropriately padded. Fractures which involve the posterior subastragalar joint with minimal displacement are also treated in that manner. Fractures with severe involvement of the posterior subastragalar joint cause prolonged disability. Three common methods for this fracture are early mobilization, the method of Boehler (or a variation thereof), and early arthrodesis. These methods, even without triple arthrodesis, eventually result in a satisfactory foot. However, union requires about 18 months, and until it occurs the patient has great disability. The foot frequently remains deformed, with no arch and a broadened heel.

Open reduction of certain fractures of the os calcis can shorten the disability and may result in a foot almost normal in both function and appearance. The author has obtained best results with modification of Palmar's technique of open reduction. He places a Kirschner wire through the tuber of the os calcis. The incision is of a short Kocher type. Further dissection reveals the peroneal tendons, which are reflected with their sheaths anteriorly. Due respect must be paid to the sural nerve, which runs almost in a line of the incision and which is carefully retracted. It is necessary to cut the calcaneofibular and anterior talofibular ligaments to obtain ingress to the posterior subastragalar joint. The usual finding here is that the facet of the posterior subastragalar joint is in 2 pieces and that the lateral piece is depressed. An elevator is placed through the aperture made by the buckling of the lateral wall of the os calcis under the depressed portion, while traction is being maintained on the heel via the Kirschner wire. The depressed portion of the posterior facet of the os calcis is elevated, and position is maintained by a bone graft placed in the resulting defect. If the articular surface itself is comminuted, elevation of the fragments permits earlier fibrous fusion and shorter disability. A long-leg plaster cast, with the knee at 45 degrees to relax the gastrocnemius muscle, is applied. After 6 weeks it is cut down into a short-leg cast so that the patient may start knee motion. The patient wears this short-leg cast an additional 6 weeks. Weight-bearing is not permitted until the graft has revascularized sufficiently, as indicated by homogeneity of the trabecular pattern on roentgenologic examination. Triple arthrodesis has proved unnecessary with this form of treatment.

Bilateral Pheochromocytoma. R. H. Flandreau and A. S. Glushien. A. M. A. Arch. Surg. **76**:62-66 (Jan.) 1958 [Chicago].

The authors describe observations on a 37-year-old man who was believed to have a chronic glomerulonephritis with secondary hypertension and was treated with the Kempner rice diet and reserpine. After 3 weeks, postprandial epigastric pain and melena developed. A clinical and roentgenographic diagnosis of duodenal ulcer was made, and, because of persistent hemorrhage, laparotomy

was considered. The record immediately prior to the operation disclosed findings suggestive of pheochromocytoma, namely, repeated episodes of profuse perspiration, unexplained low-grade fever, hyperglycemia, glycosuria, and variation of blood pressure between 140 and 280 mm. Hg systolic and 90 and 150 mm. Hg diastolic. Examination revealed both postural hypotension and postural tachycardia. Bilateral adrenal pheochromocytomas were found at operation and excised. Both adrenals were so extensively involved by tumor as to require removal in toto, leaving no apparent adrenal tissue. The blood pressure fell slightly during the initial (right) adrenalectomy but dropped precipitously with the interruption of the left adrenal vein. Restoration of normotensive levels was temporarily effected by the intravenous administration of levarterenol (Levophed) bitartrate, Phenylephrine (Neo-Synephrine) hydrochloride, and hydrocortisone. An acute peptic ulcer of the posterior duodenal wall was oversewn.

Despite the administration of hydrocortisone, adrenal cortical extract, desoxycorticosterone acetate, and vasopressor agents in customary doses, the blood pressure was not maintained at satisfactory levels. The concentration of levarterenol and phenylephrine was gradually increased until the patient was receiving these drugs undiluted. During the first 24 hours the patient received 212 mg. of levarterenol base, 2,100 mg. of phenylephrine hydrochloride, and approximately 140 cc. of epinephrine hydrochloride. The blood pressure was maintained at approximately 100/80 mm. Hg. The use of steroids and vasopressor agents in large doses was continued. The patient has been followed for 1 year since operation. The blood pressure has averaged 155/110 mm. Hg. The hemorrhages in the ocular fundi have disappeared, but a few old exudates remain. Visual acuity has improved to the extent that the patient can read small type. There has been a 60 lb. (27 kg.) weight gain. The patient has experienced mild headaches occasionally but not excessive perspiration. The abdominal complaints and melena have not recurred. Neither postural tachycardia nor postural hypotension is present. This case is believed to be the 4th instance of the successful removal of bilateral pheochromocytomas in a single operation.

Osteitis Pubis After Inguinal Herniorrhaphy. D. Le Vay and J. B. Borman. Lancet 2:1252-1255 (Dec. 21) 1957 [London].

Osteitis pubis has been generally regarded as an orthopedic complication of lower abdominal surgery and is usually the sequel, after an interval of some weeks or months, to operations on the prostate. It has been variously attributed to the effects of local trauma to this part of the pelvic girdle, to infection, and to disturbance of the local circulation. So far as the authors were able to ascertain, osteitis pubis has not previously been reported as a complication of herniorrhaphy. They present histories of 3 men, ranging in age from 32 to 49 years, in whom osteitis pubis complicated recovery from inguinal herniorrhaphy. The disease appeared within a week or two of operation and was of relatively benign type, without suppuration. The patients had completely recovered after 5 months. In the 2 patients in whom it was tried, oral treatment with cortisone was without effect on the rate of recovery. Only a combination of traumatic, vascular, and infective factors appears fully to explain the onset of this disease.

Bacteriologic and Clinical Experiences and the Methods of Control of Hospital Infections Due to Antibiotic Resistant Staphylococci. H. T. Caswell, K. M. Schreck, W. E. Burnett, E. R. Carrington and others. Surg. Gynec. & Obst. 106:1-10 (Jan.) 1958 [Chicago].

The antibiotic-resistant Micrococcus (Staphylococcus) pyogenes var. aureus has been found to be the source of infections in surgical wounds, as cutaneous infections in nurseries for the newborn, as breast abscesses in nursing mothers, in the respiratory tract as staphylococcic pneumonia, in severe types of enteritis in patients after surgical operations, and in cutaneous infections involving hospitalized patients not operated on and hospital personnel. The authors report on studies of 1 year of micrococcic infections in hospitalized patients. Specimens from patients were routinely inoculated onto the surface of 2 blood agar plates (2% trypticase soy with 8% defibrinated horse blood). Both plates were incubated overnight at 37 C, 1 plate aerobically and the other anaerobically. Nasal specimens from the hospital personnel were obtained with sterile, cotton-tipped swabs moistened in sterile saline solution. Nasal specimens from patients before operation were obtained just before anesthesia was induced. Cultures were prepared also from numerous hospital articles, such as blankets, linens, soaps, lubricating jellies, surgical instruments, suture materials, bone wax, irrigating fluid, anesthesia masks, airways, and intubation tubes. Occasional spot-check cultures were made from surgeons' hands before and after scrubbing and after various periods of operating.

Bacteriophage typing of these organisms revealed that 69% of hospital micrococcic infections were of bacteriophage type 42B/52/81. This figure compares with a 16% incidence of this bacteriophage type organism in patients admitted with micrococcic infection. Only 4.1% of 265 nasal carriers of coagulase positive micrococci among hospital personnel were infested with organisms of this bacteriophage type. Thus, nasal carriers of micrococci among hospital personnel played an insignificant role in the transmission of the organism. Efforts of

control of hospital infections with M. aureus must include measures directed with equal vigor toward both airborne and direct contact routes of transmission.

Novobiocin and chloramphenicol are the only 2 systemically administered antibiotics studied by the authors to which these organisms are highly susceptible. Micrococci resistant to both of these antibiotics can and are developing as they have developed after the use of the older antibiotics. The use of novobiocin and chloramphenicol and newly introduced antibiotic agents to which micrococci are susceptible should be limited to those patients whose organisms are not susceptible to any other antibiotic or chemotherapeutic agent and whose infection cannot be controlled by other means, such as adequate surgical drainage. Infections with these antibiotic-resistant organisms do not constitute a temporary epidemic but represent a problem which must be faced for an indefinite period in our antibiotic-saturated hospital society. Infected hospital personnel play a dominant role in the transmission of these organisms. The role of the healthy nasal carrier is equivocal. Control of these hospital micrococci cannot be attained by the discovery of additional antibiotics, because resistance to these new agents will probably develop as it has to the ones previously employed. Control must be predicated on a return to strict sterile techniques combined with intelligent limitation of the use of antibiotic agents.

Behavior of Skin Switch Homografts Between Parents and Infants. L. A. Peer, W. G. Bernhard, J. C. Walker and others. Plast. & Reconstruct. Surg. 20:273-280 (Oct.) 1957 [Baltimore].

Although it has been assumed that the tissues of the young infant behave differently from those of the embryo, it seemed possible that this change might not be a sudden one and that the injection of whole blood from a parent might render the infant tolerant to tissues from the same parent. A male infant, 3 weeks old, was cross-matched with both parents, and 2 cc. of whole blood from the mother was injected intramuscularly into the child's buttock. Both mother and child were of blood group O, positive Rh factor. Sixty-nine days later, during repair of the child's cleft lip, a full-thickness segment of skin was excised from behind the right ear. Then a full-thickness skin graft was removed from a similar area in the mother and transplanted to the child. This graft behaved like a successful autograft for 8 months, at which time it was removed with some of the surrounding skin and examined microscopically. There were normal epidermal cells and hair follicles, but the dermis of the homograft was densely infiltrated by lymphocytes. The adjacent child's skin was entirely free of this lymphocytic infiltration and contained many more blood vessels. A specimen from this same homograft had been removed for biopsy 20 days after transplantation. The epidermal cells in both the 20-day and the 8-month biopsy section demonstrated the characteristic sex chromatin which is characteristic of female skin. Since the transfer was from mother to child, the skin was the mother's rather than replacement skin from the male infant.

Thirteen additional infants have been injected intramuscularly with 4 cc. of whole blood from parents with compatible blood groups. The age of the infants at the time of injection varied from 3 to 28 days, and the time interval between blood injections and skin transplantations ranged from 40 to 75 days. Full-thickness skin-switch homografts were transplanted from parents to infants, and vice versa, in 11 cases. In the remaining 2 cases the transplantation was only from parents to infants. Three skin switches were with fathers, 1 with grandfather, and the remaining 9 between mother and child. Long-surviving skin homografts occurred only in transfers between mothers and boy or girl infants, regardless of whether the infants had received blood injections from their mothers. No long-surviving skin homografts occurred when skin was interchanged between fathers and boy or girl infants, regardless of whether the infant had received an injection of its father's blood. It seems evident that the mother of a severely burned child should be used as the skin donor instead of the father, other members of the family, or friends. Likewise, blood transfusions from mother to child seem preferable to those from the father or unrelated donors.

The longer survival of some skin homografts from mother to child, rather than from father to child, suggests that tolerance between mother and child may occur because of intermingling of fetal and maternal circulations during pregnancy. The early rejection of grafts interchanged between mother and child, which occurred in about 70% of the cases, may possibly be explained by a more complete separation of maternal and fetal circulations during the pregnancies of these mothers. The clinical possibility of artificially producing an exchange of blood elements between fetus and mother when the Rh factors are compatible is fascinating. Fetal blood elements in large quantities may sensitize a mother to her child's skin instead of rendering her tolerant. A series of skin exchanges between mothers and older children are being carried out to ascertain whether tolerance to the mother's skin may decrease as the child's age increases. An exchange of skin grafts between a mother and her 12-year-old son resulted in survival of both grafts up until the present time (120 days). Children who are tolerant to their mothers' skin may also tolerate other tissues from their mothers, and skin exchanges may prove to be useful tests to determine this.

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NEUROLOGY & PSYCHIATRY

Treatment of Pituitary Adenomas: Surgery Versus Radiation. G. Horrax. A. M. A. Arch. Neurol. & Psychiat. 79:1-6 (Jan.) 1958 [Chicago].

Earlier in the century the only known treatment capable of reducing the size of pituitary adenoma and, thus, relieving the pressure on the optic nerves with the restoration of vision was the operative removal of varying amounts of the growth. This was accomplished by the transsphenoidal procedure, with an immediate operative mortality of 4 to 5% and a 5-year mortality from recurrence of 20 to 32%. Because of the high recurrence mortality rate, the intracranial operation, with which the 5-year recurrence mortality rate was less than 10%, gained favor despite the immediate mortality rate of 12 to 14% attendant on this procedure. X-ray treatment utilized as a surgical adjunct resulted in many more patients remaining free from recurrence for longer periods than those who had not been given such treatment. X-ray treatment as sole therapy was disappointing, in that not more than 20-25% of patients showed adequate improvement or maintained vision at a useful level and in not a few instances patients finally came to be operated on after a prolonged trial of radiation therapy when vision was so greatly reduced that they were not benefited by surgical removal of the adenoma. Prior to 1950, when a tumor radiation dose did not exceed 2,000-2,500 r, 58.5% of the patients so treated had to be operated on because vision continued to deteriorate. Since 1950, when a tumor dose of 4,000 r by the rotational method with the 2-million volt apparatus was given, only 18.4% eventually required operation within the 5-year follow-up period.

Of 54 patients operated on without previous or subsequent radiation therapy, 42 survived the operation. Thirty-seven of this group have been followed up from 1 to 20 years, with an average survival of 7.8 years and an average improvement period of 6.1 years. Twenty-eight of the 37 have lived from 5 to 20 years, and 23 have maintained their improvement for these periods. In the group with surgery after radiation therapy, 56 of 61 survived the operation. All 56 lived for a few months to 20 years, or an average of 7.1 years, and maintained improvement for an average of 6.5 years. Forty-six of the 56 lived from 5 to 20 years, 44 maintaining improvement for these periods. The group receiving radiation therapy after surgery consisted of 25 patients. All but 1 have been followed for 1 to 16 years, and they have lived an average of 8.2 years and maintained improvement for an average of 7.2 years. Twenty-two have lived from 5 to 16 years, and 18 have maintained their improvement for the same length of time. In the group receiving radiation therapy only prior to 1950, 89 patients were treated for visual loss, of which 56 (62.9%) were operated on subsequently because vision was not held at a useful level. In the 1950-1955 period, 66 patients with visual loss received primary irradiation therapy with the 2-million volt apparatus by the rotational method. Thus far, only 8 (12.1%) have had to be operated on.

Convulsive Seizures Following Administration of Chlorpromazine (Thorazine). M. J. Gunter. Ohio M. J. 54:51 (Jan.) 1958 [Columbus].

Chlorpromazine has been used extensively in treatment of epileptic patients. Some workers have reported a decreased frequency of seizures, while others have reported an increased number of seizures due to this drug. The author, who has used this drug for 4 years in a psychiatric outpatient department, observed 2 patients in whom grand mal convulsions were ascribed to its use. One occurred in a patient after a period of administration of gradually increasing doses up to a relatively high level. The other occurred in an individual who had had only occasional, small doses and in whom a convulsion occurred after taking only 1 small dose of the drug. Neither of these 2 patients had a history of epilepsy.

Intracranial Metastases. T. Dalsgaard-Nielsen and B. de F. Olivarius. Nord. med. 58:1573-1776 (Oct. 17) 1957 (In Danish) [Stockholm].

Data are reported on 31 verified cases of cerebral metastatic tumors in 16 men and 15 women, aged mainly between 40 and 70 years. Intracranial metastases should be strongly suspected when a patient with or without history of primary tumor develops increasing headache and other signs of increased intracranial pressure simultaneously with psychic symptoms and scattered pareses of cranial nerves and/or extremities, particularly when combined with loss of weight, poor general condition, and increased sedimentation reaction. Papilledema was seen in only one-third of the patients. The two main localizations of the primary tumor were in the lung in men and in the breast in women. When the primary tumor is latent, diagnosis is difficult. The duration of history of cerebral disorder before admission varied in these cases from 1 hour to 12 months; the average duration was 2 months. The average length of life from the appearance of the symptoms of metastases was 5.1 months for the patients with pulmonary cancer and 7.1 months for those with cancer of the breast. In 40 to 50% of the patients with cerebral metastases, information about a primary tumor cannot be expected. Roentgenographic examination of lungs and mammae is advised. To narrow down the number of patients with primary tumors not recognized, prophylactic mass examinations will be valuable. The prognosis for patients with recognized and treated primary tumor is not better, largely because of a recognition too

late of the cerebral symptoms as the expression of metastases. Only close clinical control, especially of the patients treated for tumors with known affinity for the cerebrum, can lead to diagnosis and better possibilities for treatment.

Neurologic Syndromes of Malignant Tumors: I. Neuropathies Associated with Cancer. D. Furtado. Arq. pat. 29:173-197 (July) 1957 (In Portuguese) [Palhava, Lisboa].

The author observed several hundred patients with neurological symptoms due to diffuse malignant tumors at the Instituto Portugues de Oncologia at Lisbon. There is a group of neuropathies with accompany of complicate cancer and are of value in an early diagnosis of cancer. Sensitive (peripheral) and sensory-motor neuropathies and myopathic pseudomyasthenia are always associated with bronchopulmonary cancer. Funicular myelosis is associated with gastric cancer, and cerebellar neuropathy is associated with cancer in any of the various structures. Sensitive (peripheral) neuropathy appears months and even years before the symptoms of bronchopulmonary cancer. After appearance of the neuropathy, the patient develops a chronic bronchitis. The neurological symptoms consist of painful paresthesia and burning sensations of the legs and appearance of the so-called syndrome of burning feet. The neuropathy follows a long course, with periods of improvement alternating with moderate exacerbation. The course of the neuropathy is independent of the course of cancer and the production of metastases, even if the metastases are localized in the central nervous system. The clinical diagnosis is verified by roentgenographic examination of the chest. Early removal of the tumor results in a complete recovery, with disappearance of the neuropathic symptoms. The anatomicopathological features of the neuropathy consist of marked demyelinization of the spinal ganglions and moderate demyelinization of the roots and of the posterior columns of the spinal cord. Sensory-motor neuropathy appears late in the course of bronchopulmonary cancer when the latter cancer is diffuse and in a very advanced stage. It is frequently associated with either funicular myelosis of myopatic pseudomyasthenia. Funicular myelosis appears early in patients with cancer of the stomach. The patients complain of gastric disorders and show a marked weakness in walking. Gastric tests always show marked achylia, which seems to be the causal factor of funicular myelosis. The clinical diagnosis of cancer of the stomach is confirmed by the roentgenographic examination of the stomach. Gastrectomy results in disappearance of the neuropathy. The anatomicopathological features consist of demyelinization of the myeline sheath and neurolytic tumefaction of the axis cylinder. Myopatic pseudomyasthenia is a muscular disorder complicating the late stages of bronchopulmonary cancer. The clinical symptoms and the anatomicopathological features are those of progressive muscular dystrophy and myasthenia. Cerebellar neuropathy appears as a final complication of cancer of the breast, the lung, the uterus, the ovaries, and other structures, with spread of the disease. The symptoms and anatomicopathological features correspond to those caused by atrophy of the cerebellum. Neuropathies that develop in association with cancer are due neither to the cancer nor to the metastases. Both carcinogenesis and the neuropathies are the result of the action of an unknown factor, probably a virus which first gives origin to the tumor, travels from it through the nerves to reach the central nervous system, and gives origin to the neuropathy.

PEDIATRICS

Histiocytoma of the Bronchus: Report of a Case in a Six-Year-Old Child. T. Bates and O. H. Hull. A. M. A. J. Dis. Child. 95:53-56 (Jan.) 1958 [Chicago].

A 6-year-old boy had had pneumonia 3 weeks before examination, and he complained of persistent cough. The past history was significant in that he had had pneumonia at the age of 4 years. Both lung fields contained scattered medium moist rales. There were no other abnormal physical findings. Fluoroscopic examination showed opacity of the lower portion of the right lower lobe. A diagnosis of pneumonia, etiology undetermined, was made. He was treated with bed rest and chlortetracycline and seemed to recover completely. Reexamination by fluoroscope showed a narrow area of persistent opacity lateral to the right cardiac border. Several weeks later the boy had a paroxysm of coughing after eating. The cough persisted, and 2 days later he had a temperature of 104 F (40 C), red bulging tympanic membranes, and dullness at the right lung base. Bed rest and chlortetracycline therapy were resumed. After 8 days of treatment, with symptoms and signs unchanged, roentgenographic examination revealed an apparent atelectasis of the right middle lobe of the lung, possible atelectasis of the anterior segment of the right lower lobe, compensatory emphysema in the remainder of the right lung field, and pleural effusion or thickened pleura at the right base. A tuberculin patch test showed no reaction. The impression was that an occlusion of the right main stem bronchus existed and that this was due to either a bronchial tumor or a foreign body.

Bronchoscopy showed a tumor obstructing the lower right main bronchus. It was firm and slightly lobulated and bled slightly when the largest portion was removed with a forceps. The preliminary report of the pathologist stated that the tumor was

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"anaplastic and infiltrative." A subsequent report stated, "Bronchus infiltrated by masses of large reticuloendothelial cells, suggestive of endothelioma or reticuloendotheliosis." Bone marrow studies showed no reticuloendothelial infiltration. At operation no tumor could be palpated in the lung, bronchi, or mediastinum. The right main stem bronchus was opened, and a small tumor was seen 1 cm. below the carina. Examination of a frozen section of tissue from the tumor resulted in a diagnosis of "anaplastic squamous cell carcinoma of the lung." A right pneumonectomy was done. The patient tolerated the operation well. In later years the boy had difficulty with frequent respiratory infections, and his physical activities were somewhat limited. He died at age 11 after a fulminating pneumonia. The tumor was composed of cells which histologically were histiocytes. Histiocytes or fixed macrophages are cells found in the loose connective tissues of the body that are capable of taking up particulate matter and storing foreign substances brought to them in colloidal solution. Under the stimulus of inflammation new histiocytes develop by mitotic division of the preexisting macrophages, by direct assumption of phagocytic activity by mesenchymal cells, and by hypertrophy and development of lymphocytes and monocytes. On the microscopic evidence alone the tumor was identified as an histiocytoma. The authors consider this tumor to be benign. They found no previous report of a histiocytoma of the bronchus in childhood.

Prevalence of Heart Disease in Relation to Some Population Characteristics of Colorado School Children. H. J. Dodge, G. J. Maresh and N. M. Morris. Am. J. Pub. Health. 48:62-70 (Jan.) 1958 [Albany, N. Y.].

This study is concerned with the prevalence of heart disease in 10,948 children enrolled in the 6th grade of schools in 41 Colorado counties during the period 1949-1951. This group included 2,010 Spanish-American and 8,938 Anglo-American children. Other ethnic groups were too small in number for consideration. The over-all or general prevalence ratio for clinically definite heart disease was 9.6 per 1,000 children examined. This figure was made up of 6.8 cases of rheumatic heart disease and 2.8 cases of congenital heart disease per 1,000. The most striking finding was the difference in heart disease prevalence between the 2 major ethnic groups The Spanish-American children had a general prevalence ratio of 13.9 cases per 1,000, as contrasted with 8.6 for the Anglo-Americans. The difference was more conspicuous for rheumatic heart disease than for congenital heart disease. Spanish females had somewhat more heart disease than males, but the reverse was seen in the Anglo-American children. It is shown that the prevalence of rheumatic and congenital heart disease is greater among rural than urban dwellers in Colorado, and, though the data are of less reliability, there is an indication that those living in home conditions of little crowding have lesser risk of childhood types of heart disease than those who live in crowded conditions. It is felt that all of the differences in heart disease prevalence demonstrated in this study are best explained on the basis of environmental factors that are cultural or socioeconomic in nature.

Preliminary Report on Treatment of Mongoloids. C. H. Carter and M. C. Maley. J. Florida M. A. 44:709-713 (Jan.) 1958 [Jacksonville].

This report is concerned with the use of calf pituitary extract in the treatment of mongoloid children, a form of treatment that was first suggested by Benda. The initial dose has been 1 grain daily, increased at 2-week intervals until tolerance of 4 grains is reached. The powder of calf pituitary is mixed with milk or food. There has been no problem in administration or tolerance. The only untoward reaction has been hyperirritability, which disappeared when the dose was decreased. Twenty-six mongoloid children were studied with this type of therapy. The majority of these children have been under the care of their private physicians and have been followed by the authors with special attention to mental and physical development over long periods of time. In several of these children treatment was started at 6 weeks of age, and in a number of them it was started between the ages of 2 and 8 months.

The observations presented should be interpreted only as preliminary impressions and not as completely controlled observations. Three patients appear to have developed a normal I. Q. range at the present time and have lost some of the mongoloid stigmas. In the remaining cases studied the results have varied from no real degree of I. Q. improvement to significant degree of improvement. The authors are not able to explain the results, since the majority of endocrinologists are of the opinion that orally administered pituitary extract is destroyed in the stomach. There is a uniform eosinophil response in the differential counts while treatment is being administered. This suggests absorption of calf pituitary extract. Clinical improvement observed in this preliminary study warrants continuation of this therapy and expansion of research along these lines.

Addison's Disease in Children: Report of Two Cases. R. E. Greenberg. J. Pediat. 52:54-65 (Jan.) 1958 [St. Louis].

The author reports on 2 boys with chronic adrenal insufficiency (Addison's disease), 1 of whom was first seen when 11 years old and the other at 7 years of age. Reports in the literature show that chronic adrenal insufficiency is rare in children. This is especially true of cases of primary adrenal

atrophy or involution not associated with adrenal destruction by disease process or by hemorrhage or with specific abnormality in hormone synthesis. In the 2 cases reported, the usual clinical and laboratory data had to be supplemented by measurements of adrenal hormones in urine and blood before the diagnosis of Addison's disease could be established. The symptoms and signs of chronic adrenocortical insufficiency seldom suffice to certify a diagnosis. Similarly, reliance on laboratory methods that do not involve actual measurements of adrenal hormones in plasma and urine may obscure an underlying adrenal insufficiency by false-negative results. The use of the quantitative determinations of adrenal response to corticotropin (ACTH) stimulation as reflected in urinary excretion of 17-ketosteroids and 17-hydroxycorticoid levels provides the most accurate laboratory tool available for the diagnosis of Addison's disease.

In the replacement therapy of Addison's disease, it would be advantageous to be able to use agents that, with a minimum of expense and deleterious side-effects and a maximum of stability, would provide orally given replacement therapy in as physiologic a manner as possible. Cortisone, hydrocortisone, and their derivatives provide adequate glucocorticoid properties but do not supply sufficient mineralocorticoid properties in the doses required for maintenance therapy. Use of supplemental salt and desoxycorticosterone (DCA) administered parenterally (in the forms of acetate in oil, trimethylacetate, or pellets) has been necessary to create adequate mineral homeostasis. Substitution of a fluorine atom in the 9-alpha position of the hydrocortisone molecule produces a marked potentiation of glucocorticoid effect and an even greater potentiation of mineralocorticoid effect. The 9-alpha-fluorohydrocortisone provides an agent which, when used together with cortisone or hydrocortisone, promises to allow effective, safe, and relatively inexpensive oral therapy for chronic adrenal insufficiency.

Sarcoma Botryoides of the Vagina in Infancy and Childhood: A Case Report. A. W. Cavins, W. P. Meyn and G. T. Mitchell. J. Indiana M. A. **50**:1487-1496 (Nov.) 1957 [Indianapolis].

The authors present the history of a 6-month-old girl who appeared well at birth and for 6 months thereafter. Then blood was observed on the diapers. Several days later there was a great deal more bleeding, with passage of some clots. Examination of the vagina, with the patient under anesthesia, revealed bleeding from the upper vagina; in that region a few small, grape-like growths were seen. Three bits of tissue were obtained with an endoscopic biopsy forceps. The diagnosis was cervical or vaginal lesion—a possible sarcoma botryoides. The pathologist reported the biopsy as showing "mixed mesodermal tumor (sarcoma botryoides)." After a total hysterectomy and a nearly total vaginectomy to remove the tumor, the child was well at first; then she began to show general deterioration, with anorexia and evidence of extensive recurrence of the sarcoma botryoides. She died 3 months after the first operation.

Extensive metastases had developed in this patient not only by direct extension in several directions but also to the vertebral lymph nodes, the liver, and the lungs. Extensive collateral circulation developed from obstruction of the inferior vena cava. Growth of this tumor was astonishingly rapid. The authors cite investigators who believe that the primary site of botryoid sarcoma depends on the age of the patient. In infancy and childhood the vagina is the place of origin; during the years of active reproductive life, the site is the cervix; tumors of the fundus occur in the postmenopausal years. The authors emphasize that botryoid sarcoma of the vagina occurs in infants. Surgery, combined surgery and radiation, and radiation alone seem to be ineffective. Spread of the tumor is largely by direct extension. This tumor is apparently of mesenchymal origin.

OTOLARYNGOLOGY

Tympanotomy, Mobilization of the Stapes and Fenestration. G. A. Hoogland. Nederl. tijdschr. geneesk. **101**:1865-1869 (Oct. 5) 1957 (In Dutch) [Amsterdam].

The mobilization of the stapes, as reported by Kessel-Miot and rediscovered by Rosen, may produce favorable results in patients with ankylosis of the stapes (otosclerosis). The indication for this operation is more extensive than that for fenestration. The principle of the mobilization of the stapes consists in the remobilization of the stapes footplate from the fenestra ovalis to which it has become attached, while the chain of auditory ossicles is preserved. If this is accomplished, the air-conduction curve in the audiogram practically coincides with the bone conduction curve, a result superior to the hearing improvement that can be achieved by an ideal fenestration. This proves that stapes mobilization is suitable not only for patients with otosclerosis who are considered suitable for fenestration but also (1) for patients in whom otosclerosis is not sufficiently advanced to justify a fenestration, and (2) in those patients with otosclerosis in whom the function of the middle ear has been impaired to such an extent that fenestration cannot be expected to produce a satisfactory hearing improvement.

The diagnosis of otosclerosis may prove extremely difficult. In some patients it can only be stated that there is "middle-ear hardness of hearing, probably resulting from otosclerosis." The terminal

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states after recurrent tubal infections and healing of otitis media may produce conditions that have been summarized as "clinical otosclerosis." The patients with clinical otosclerosis include some in whom the motility of the auditory ossicles is restricted by fibrous strands or by adhesion to the fenestra rotunda. While both these conditions are amenable to surgery, they do not call for fenestration of the horizontal semicircular canal. Since it is possible to perform a fenestration after a stapes mobilization has been done, the latter intervention becomes a preliminary operation. An exploratory tympanotomy, with approach through the external auditory meatus, allows inspection of the tympanic cavity; then several procedures are possible: (1) removal of adhesions or tympanoplasty in the presence of a true ankylosis of the stapes; (2) mobilization of the stapes; and, if this fails, (3) fenestration.

Endolaryngeal Carcinoma: A Survey of 206 Cases. E. H. M. Foxen. J. Laryng. & Otol. 71:787-799 (Dec.) 1957 [London].

The boundaries of the intrinsic larynx are defined. Lesions above the free border of the ventricular band are classified with extrinsic carcinoma and are not considered in this report, which included the cases of 183 men and 23 women. The highest incidence in men was from 61 to 65 years and in women from 51 to 55 years. There is evidence that patients with hoarseness now seek medical advice earlier than formerly. The most frequently affected site is the anterior part of the vocal fold. In 166 patients in whom the histology could be classified, 79% were shown to have differentiated lesions and 21% anaplastic; the latter was found to occur more frequently among women. In 65 patients who have since died, the relative frequency of recurrence in the lymphatic tissue of the tracheoesophageal gutter was noted.

The site of the disease, mobility and histology, and their bearing on treatment and prognosis were evaluated. Mobility is of supreme importance, and lack of mobility generally constitutes an indication for surgery in operable cases. Anaplasia is not always an indication of over-all malignancy. Teleradiotherapy is the treatment of choice for patients with mobile glottic lesions. Laryngectomy with radical neck dissection is advocated in all operable tumors in the subglottic region and in those of the supraglottic region or of both sides of the larynx when there is reduction of mobility. Glottic lesions with reduction of mobility and early supraglottic and bilateral lesions with full mobility constitutes a more difficult problem in regard to choice of treatment. Laryngectomy with radical neck dissection is indicated for maximum safety in such cases, though this is often sidestepped by the policy of radiotherapy first with surgery for recurrence. This policy is fraught with danger.

THERAPEUTICS

A New Method for Treating Slow-Healing Wounds. A. B. Rosenberg. Postgrad. Med. 23:49-60 (Jan.) 1958 [Minneapolis].

The author reports on 9 patients between 57 and 83 years of age with pigmentation and stasis ulcers of varying size and varying duration up to 20 years who were treated as follows. Ten thousand fibrinolytic units of human profibrinolysin (Proactase), 150 units of hyaluronidase (Diffusin), and 5,000 units of streptokinase-streptodornase (Varidase) were reconstituted in isotonic sodium chloride solution and applied on wet compresses to the affected area. The sole function of the small amount of streptokinase used was to transform the inactive profibrinolysin into the active enzyme fibrinolysin. The compresses were covered with a light bandage and were applied daily for from a few days a week to several weeks. With a single exception the patients were at all times ambulatory and were seen at the author's office. No other medications were applied during the intervals of treatment.

The use of activated profibrinolysin with hyaluronidase resulted in the cure of 8 of the ulcers. One patient died from other causes during the course of the treatment, but the ulcer for which he was treated showed marked improvement despite excessive edema. The use of activated profibrinolysin did not produce any side-effects, such as pain, fever, necrosis, or other sequelae. The treatment was less expensive to the patient than hospital care, and the patients were free to pursue their normal occupations.

Poor blood circulation and infection of the wound area are 2 of the most important factors for the delay in wound healing. A poor blood supply due to varicosities or thrombosis deprives the area of nutrition and presents the formation of healthy granulation tissue and epithelization. Infection is responsible for the production of the exudate and epithelial debris which block the intercellular spaces, preventing ingress of oxygen and nutrients. Hyaluronidase combined with activated profibrinolysin, which lyses the fibrinous exudate, aids in producing intercellular passage of these necessary components. The removal of debris and the increased permeability promote healing by the production of healthy granulation tissue and epithelization.

Anisindione: A New Anticoagulant with Unusual Properties. K. Lange, E. Perchuk, M. Mahl and others. Am. Heart J. 55:73-79 (Jan.) 1958 [St. Louis].

Anisindione (2-*p*-anisyl-1,3-indandione) an anticoagulant of the indandione type, was given orally to 52 patients between 47 and 89 years of age for a total of 1,198 patient days. Six of the 52 patients

had arteriosclerotic heart disease with auricular fibrillation, 2 had rheumatic heart disease with auricular fibrillation, 1 had postphlebitic syndrome, 1 had acute deep thrombophlebitis, 2 had arteriosclerosis obliterans with arterial thrombosis, 24 had arteriosclerosis obliterans, 12 had old cerebrovascular accident, and 4 had varicose ulcers. A dosage scheme was worked out for the initiation of a satisfactory reduction in prothrombin activity. This schedule consisted of 500 mg. the first day, 300 mg. the second day, nothing on the 3rd day, and 300 mg. on the 4th day. This dosage was used in 23 patients, and prothrombin activity in all had reached therapeutic levels within 36 to 72 hours. The therapeutic level was maintained rather uniformly with a maintenance dose of 250 mg. every 3rd day. The longest maintenance period was 112 days.

The individual response to a given dose of the drug is usually uniform. The effect of the drug can be rapidly interrupted by the use of phytonadione (Mephyton), 50 mg. of which may be given slowly intravenously in 10 cc. of isotonic sodium chloride solution or 10% dextrose solution. Maintenance doses of anisindione retained the anticoagulant effect previously established with bishydroxycoumarin (Dicumarol). Side-reactions to anisindione were noticeably absent in these patients. There were 3 instances of hematuria, 1 occurring at a therapeutically desirable level, 1 in a patient with a renal calculus, and 1 at a purposely induced very low prothrombin activity. There was no chromaturia, petechiae, agranulocytosis, or liver damage.

Comparative Clinical Study of Coumadin Sodium and Dicumarol in Patients with Thromboembolic Diseases. C. M. Shapiro, R. Lisker, A. M. Lichtman and A. M. Josephson. Am. Heart J. **55**:66-72 (Jan.) 1958 [St. Louis].

In an attempt to compare the efficacy of warfarin (Coumadin) sodium and bishydroxycoumarin (Dicumarol), the authors treated 100 patients with thromboembolic disease with warfarin and 100 patients with the same disease with bishydroxycoumarin. Fifty patients treated with warfarin and 55 patients treated with bishydroxycoumarin were given aqueous heparin, 50 units intramuscularly every 4 to 6 hours, during the induction period. Patients were considered to be in a therapeutic anticoagulant range when the prothrombin time according to Quick's method was between 24 and 36 seconds (11-26% prothrombin activity). The initial dose of warfarin was arbitrarily fixed at 50 or 60 mg., depending on the weight of the patient. From 5 to 30 mg. was employed on the second day. The average daily maintenance dose was 5-10 mg. The drug was given orally in all but 4 patients who, because of nausea and vomiting, required intravenous administration. Bishydroxycoumarin was given initially in successive daily doses of 300, 200, and 100 mg., with only slight modifications depending on the results of prothrombin determinations.

Results showed that the ability of warfarin and bishydroxycoumarin to maintain a therapeutic hypoprothrombinemic state does not differ, since warfarin therapy was effective 70.8% of the time and bishydroxycoumarin therapy was effective 70.3% of the time. The latency period in the patients taking warfarin averaged 43.4 hours, and in those taking bishydroxycoumarin it averaged 80.3 hours. Heparin had no effect in shortening the induction period when given with warfarin but decreased by 12 hours the average latent period in patients receiving bishydroxycoumarin. Hypersensitivity to these 2 drugs was not significantly different, but escape from the effect of bishydroxycoumarin was almost twice as common. The ability of vitamin K and related compounds to reverse the action of these drugs was similar. Hemorrhagic phenomena were observed in 11 patients taking warfarin and in 8 patients receiving bishydroxycoumarin. Only 1 death was attributed to anticoagulant therapy; the patient died of intracranial hemorrhage and had received bishydroxycoumarin. The mode of action of warfarin, as with bishydroxycoumarin, seems to reside more in its ability to decrease the activity of stable factor than in the suppression of prothrombin activity.

Use of the "Colloid Osmotic Prosthesis" in the Therapy of Certain Edematous States. S. Esposito. Gazz. med. ital. **116**:435-444 (Oct.) 1957 (In Italian) [Turin].

The author studied the diuretic effect of dextran in 2 groups of patients. One group consisted of 12 patients with compensated cardiovascular condition and normal blood pressure, whereas the other group consisted of 8 patients with various diseases associated with edema which was partly due to lowered plasma oncotic pressure. Dextran was given intravenously in a daily dose of 500 cc. to the patients in fasting state as a 10% colloid solution, infused at the rate of about 40 drops per minute for a period of 30 days. Patients with noncardiac conditions received a daily single dose, whereas the daily dosage of the patients with cardiac condition was divided into 2 equal doses, given morning and evening. Renal function in patients with a cardiac condition was observed before and 6 hours after the infusion of dextran. Dextran had an intense diuretic effect in all patients. This was confirmed by the increased rates of the glomerular filtration tests and by the decreased rates of tubular reabsorption of water tests. Dextran exercised a strong diuretic action and produced relief of edema in patients who had various diseases associated with edema. The best results were observed

in patients who had a kidney disease. Two patients with biliary cirrhosis in the last stage of the disease derived no benefit from dextran therapy.

Several workers have demonstrated that dextran is completely metabolised in the body. The macromolecular structure of dextran brings about a long-acting increase of the colloid osmotic pressure. The author believes that these properties warrant the use of dextran as a "colloid osmotic prosthesis."

Rauwolfia Toxicity in the Treatment of Hypertension: Comparative Toxicity of Reserpine and Alseroxylon. R. V. Ford and J. H. Moyer. Postgrad. Med. 23:41-48 (Jan.) 1958 [Minneapolis].

The authors present a statistical analysis of the adverse reactions from Rauwolfia preparations observed in 452 patients with hypertension, 120 of whom received reserpine and 332 of whom received alseroxylon. Mild adverse effects, consisting of weakness and fatigue, occurred in 103 (86%) of the 120 patients; 88 (73%) complained of malaise, and 62 (52%) had dizziness. These symptoms persisted for more than 3 months in most of the patients. Moderate adverse effects were less frequent, nightmares occurring in 64 patients (53%) and insomnia in 61 (51%). Severe adverse effects were observed in a smaller group; agitation occurred in 37 (31%), depression in 18 (15%), and serious agitated depression in 18 (15%). The incidence of weakness and fatigue among the 332 patients receiving alseroxylon was 84%; malaise was noted in 65% and dizziness in 29%. About 20% of the group had these symptoms for more than 3 months. Moderate adverse side reactions consisted of nightmares in 18% and insomnia in 7%. Thirteen (4%) of the 332 patients showed agitation, 5 (2%) had a severe depressive reaction, and a disabling agitated depression occurred in 3 patients (0.9%).

These data reveal significantly more frequent and severe adverse side-reactions to reserpine than to alseroxylon. There are certain factors that one must consider as potentiating or predisposing to these side-reactions, as indicated by the finding that patients with previous neuropsychiatric diagnoses have these reactions much more often than do those without such diagnoses. The incidence of severe side-reactions was twice as high when the dose of reserpine was 1 mg. or more per day than it was when the dose was less than 1 mg. daily. The severity of hypertensive disease, as indicated by the necessity for therapy with ancillary antihypertensive agents, did not seem to influence the incidence of adverse side-reactions from the Rauwolfia compounds. Alseroxylon is an antihypertensive agent of equal therapeutic efficacy with reserpine in treatment of hypertension but with significantly less toxicity. A useful procedure in the initial treatment of hypertension is to start with reserpine, giving 0.25 mg. twice daily concurrently with 2 mg. of alseroxylon 4 times daily. Reserpine has an onset of action within 3 to 5 days, while the maximal response to alseroxylon is not obtained for 14 to 21 days. After 2 or 3 weeks one may discontinue the administration of reserpine, since the effect of alseroxylon has become established, and the dose of the latter may be reduced to 2 mg. twice daily. Ancillary antihypertensive therapy may be added as indicated.

Treatment of Influenza with Severe Bronchopulmonary Complications with Cortisone and Antibiotics. M. Plaza de los Reyes, R. Cruz-Coke, R. Orozco and others. Rev. méd. Chile. 85:569-573 (Oct.) 1957 (In Spanish) [Santiago].

Three hundred sixty-five patients with severe forms of either pneumonia or bronchopneumonia complicating influenza were hospitalized in the Aguirre Hospital at Santiago between July and August, 1957. The more severe complications of influenza were observed in patients with heart disease and chronic pulmonary disease and in elderly patients. The treatment consisted of administration of penicillin, streptomycin, and tetracycline in daily doses of 800,000 units, 1 Gm. and 2 Gm. respectively. No favorable changes in the course of the pulmonary disease were obtained from antibiotic treatment. Seventy-five patients died (21.6%). In patients with bronchopneumonia the death rate was 50%. Cortisone in daily doses of 100 mg. or prednisone in daily doses of 20 mg. were added to the antibiotic treatment. The combined treatment was maintained for 5 or 10 days, after which the daily dose of cortisone was gradually diminished to 75 mg. for 5 days, 50 mg. for 5 days, and then discontinued. Seven representative cases are reported. The patients were 3 young adults and 4 persons between the ages of 60 and 82 years. Before onset of influenza, the patients had one of the following diseases: active pulmonary bilateral tuberculosis, hepatitis, cardiosclerosis with insufficiency and congestive heart, cirrhosis, hepatitis, cardiosclerosis and diabetes. The pulmonary complications were unilateral or bilateral staphylococcal or pneumococcal pneumonia in 4 patients and bilateral bronchopneumonia in 3. Simultaneously with the treatment with hormones and antibiotics, cardiotonics were given to patients with cardiac insufficiency and isonicotinic acid to the patient with pulmonary tuberculosis.

The results of the combined treatment were excellent. All of the patients recovered after 10 to 23 days of hospitalization. Dyspnea and fever disappeared, the pulse became normal within 24 hours, and the bronchopulmonary symptoms subsided within 5 to 10 days of treatment. The treatment was well tolerated. The patients who were given antibiotics presented only a marked asthenia. Several of the patients died in shock caused from

suprarenal insufficiency. On the basis of this observation the authors believe that the virus of influenza causes suprarenal insufficiency, which is prevented or controlled by cortisone therapy. They recommend combined antibiotic-hormonal treatment in cases of severe bronchopulmonary complications of influenza.

Long-Continued Treatment with Tetracycline and Prednisolone in Chronic Bronchitis: A Controlled Trial. E. N. Moyes and R. A. Kershaw. Lancet 2:1187-1191 (Dec. 14) 1957 [London].

Chronic bronchitis was defined for the purposes of this trial, as a chronic condition of at least 2 years' duration, characterized by a productive cough throughout the year and associated with dyspnea and bronchospasm. Preference was given to patients with pus in their sputum, and only those with moderate or severe disability were accepted. Care was taken to eliminate patients with typical bronchial asthma and with the so-called asthma-bronchitis or infected asthma, where differentiation between the 2 conditions is difficult, 1 merging into the other as infection supersedes on an asthmatic basis. Also excluded were patients with past or present evidence of cardiac failure, significant hypertension, peptic ulceration, or mental instability, who might have responded unfavorably to steroid therapy. Patients of group A, who served as controls, were given dummy tablets for 7 days and then aminophylline. Those of group B received first 500 mg. of tetracycline 3 times a day for 7 days, thereafter 250 mg. plus aminophylline. Those of group C received the same doses of tetracycline as did those of group B, and in addition 5 mg. of prednisolone 3 times a day.

Significant and often dramatic improvement was observed in 60% of the patients in the 2 groups who received tetracycline. This compares with 6% improvement in the group in which dummy tablets were substituted for the antibiotic. Diarrhea was reported by 33 (60%) of the 55 patients who received tetracycline. In 19 it was mild, but in the other 14 it was severe enough to call for modification of treatment. In 5 patients the administration of tetracycline was stopped temporarily until the symptom abated; in 3 a reduction in dosage for a week or 2 sufficed. Four patients were never again able to tolerate more than 500 mg. of tetracycline twice a day; in 2 other patients, long-continued treatment with oxytetracycline in 1 and sigmamycin in the other was substituted after efforts to reintroduce tetracycline therapy had failed. The results were practically the same in the 2 groups who received tetracycline, regardless of whether prednisolone or aminophylline was given in addition. This suggests that corticosteroids have little, if any, value as maintenance therapy in patients with chronic bronchitis.

PUBLIC HEALTH

Power Lawnmower Injuries in Georgia, 1955 and 1956: Results of a Survey. J. N. McClure Jr., H. C. Steed Jr., R. M. Alden and J. C. Terrell. J. M. A. Georgia. 46:555-557 (Dec.) 1957 [Atlanta].

In the late fall of 1956, after the lawnmowing season was over, a survey of Georgia physicians was made by means of a questionnaire in an attempt to more accurately measure the number and type of injuries caused by power lawnmowers. This survey was conducted by the Accident Prevention Unit of the Georgia Department of Public Health in cooperation with interested private physicians. Questionnaires were sent to 1,085 physicians. Of the 463 physicians who answered the questionnaires, 226 (48.8%) reported power lawnmower accidents while 237 did not. Many of the physicians in this last group were in specialties which would rarely, if ever, be called on to treat such injuries. The survey included only privately practicing physicians. No attempt was made to collect information from the emergency rooms of large hospitals. The gasoline rotary type mower was involved in the majority of the accidents, probably because it is both more dangerous and more frequently used than the other types of mowers. Most injuries resulted from direct contact with the mower, but a surprisingly high percentage (30.4%) were caused by objects which were thrown by the mower blade. The victims of such missiles were frequently not the operators of the machines. Over 90% of the injuries due to direct contact with the mower were injuries to toes, fingers, feet, or hands; many of these are probably due to negligence on the part of the operator.

The lower extremities were most often injured by objects thrown by the mower blade, but a considerable number of eye injuries were also caused in this way. The number of injuries producing permanent disabilities (14.1%) was surprisingly high, and attests to the violence of these machines. This study indicates that the problem of power lawnmower injuries is one of considerable magnitude. If the number of injuries continues to increase in the next few years, the power mower, particularly the rotary type, conceivably may be designated as a public health menace. The following recommendations are made: Organizations (such as the National Safety Council and the Public Health Departments) and the lay press should give educational publicity to this problem. Accident prevention should be emphasized. The county medical societies should encourage their members to speak before such groups as civic clubs, schools, and churches. Much can be done toward accident prevention in this manner, particularly with the help of the local press.

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BOOK REVIEWS

Pre-Employment Disability Evaluation: Detailed Policies Regarding Applicants Applying for Employment with Special Reference to Various Disabilities. By William A. Kellogg, M.D., F.A.C.S., Clinical Professor of Surgery, New York Polyclinic Post-Graduate Medical School, New York. Preface by H. L. Herschensohn, M.D., Medical Director, Douglas Aircraft Co., Inc., Santa Monica, Calif. Cloth, perforated for loose-leaf use. $10.50. Pp. 155. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada. 1957.

There is little doubt that, as medicine and associated sciences are enabled to salvage many persons who previously died before reaching maturity, industry will be more and more confronted with the too frequently submarginal physical laborers. The author has done much in this book to assist those who engage in this necessary type of industrial medicine. He describes a simple, logical basis for acceptance or rejection of those who are being considered for employment. Numerous blank pages are provided for special entries that may apply to the industry by which the medical examiner is employed and which the author has not covered in his text. All pages are perforated to enable one to prepare his own notebook and to arrange the material presented in the most convenient sequence. This book should be read by all physicians in industrial medicine and also by those who make only occasional preemployment physical examinations.

Liver-Brain Relationships. By Ian A. Brown, M.D., Ph.D., Associate-Professor of Neurology, Division of Neurology, Department of Neurology and Psychiatry, University of Minnesota, Minneapolis. Cloth. $6.50. Pp. 198, with 26 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill., Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

This monograph attempts to bridge the gap between what is currently known about the various types of liver disease and the changes in the central nervous system which may accompany or follow liver damage. A brief historical review of the liver-brain relationship is given in the opening chapter. Kinnier Wilson's monumental contribution, clarifying the relationship between liver disease and lenticular degeneration of the brain, is given due credit. One chapter is devoted to the liver and the many attempts to evaluate its functions. Admittedly, the present liver function tests leave much to be desired, and newer biochemical knowledge is necessary to evaluate all of the dozens of functions which the liver has. A discussion of the possible causal relations between alterations of those functions that produce central nervous system symptoms inevitably raises more questions than it answers. The author presents the following clinical classification of the nervous system participation in hepatic disease: (1) hepatoencephalomyelopathy without coma, (2) transient or episodic hepatoencephalomyelopathy, (3) hepatoencephalomyelopathy with coma and its immediate precoma stages, and (4) hepatolenticular degeneration (Wilson's disease). The interesting role of ammonia in brain function is discussed at some length in connection with portacaval shunt. The so-called blood-brain barrier, which permits some substances to pass quickly and which effectively bars other substances, is presented without any conclusions. The increasingly voluminous literature on the role of glucose metabolism, enzymes, iron, copper, porphyrins, hormones, amino acids, bile, oxygen, and carbon dioxide is well summarized and documented. The author concludes that no single substance can be incriminated as the cause of the cerebral alterations. This stimulating and provocative book should interest the neurologist, the internist, and the better-informed general practitioner.

An Introduction to Chest Surgery. By Goeffrey Flavell, F.R.C.S., M.R.C.P., Thoracic Surgeon, London Hospital, London. Cloth. $7.50. Pp. 354, with 177 illustrations. Oxford University Press, Amen House, Warwick Sq., London, E. C. 4, England; 114 Fifth Ave., New York 11; Amen House, 480 University Ave., Toronto 2, Canada, 1957.

This short and yet comprehensive monograph is an excellent book for any student or practitioner interested in chest diseases. The first chapter deals with the physiology of the lungs. The author's statement, "Bronchial obstruction is just as much an acute surgical emergency as intestinal obstruction," suggests that he has had relatively little experience in the treatment of intestinal obstruction. However, the chapter is well done, as is the second chapter on surgical anatomy. Roentgenography of the chest is adequately covered, as is bronchoscopy. One chapter is devoted to the technique of pulmonary resections, including preoperative and postoperative care. The illustrations are line drawings and are excellently done. The x-rays are reproduced well. There is an excellent chapter on the chest wall and pleura, including injuries and inflammatory and neoplastic lesions. There is a rather long chapter on empyema; in fact, empyema is considered in greater detail than is probably necessary

These book reviews have been prepared by competent authorities but do not represent the opinions of any medical or other organization unless specifically so stated.

in view of its relative infrequency. Abscess of the lung, both malignant and benign, and bronchiectasis are considered. A short chapter deals with the various types of cysts of the lung. There is also a short chapter on benign tumors of the lung and an excellent chapter on bronchogenic carcinoma. The author, strangely enough, does not mention pulmonary function studies as a preoperative procedure. Various methods of therapy are considered. Pulmonary tuberculosis and its surgical treatment are discussed. Thoracoplasty is described in greater detail than is necessary, because it is now rarely used. There is an excellent chapter on tumors and cysts of the mediastinum and a good description of diaphragmatic hernia. There is also a splendid section on esophageal operations. The final section is devoted to surgery of the heart and great vessels. It is regrettable that this excellent book has no bibliography. However, it should be in every student's library.

The Healing of Wounds: A Symposium on Recent Trends and Studies. Edited by Martin B. Williamson, Ph.D., Professor of Biochemistry, Stritch School of Medicine, Loyola University, Chicago. Cloth. $7. Pp. 202, with illustrations. Blakiston Division, McGraw-Hill Book Company, Inc., 330 W. 42nd St., New York 36; 95 Farringdon St., London, E. C. 4, England; 253 Spadina Rd., Toronto 4, Canada, 1957.

This symposium is a summation of the material accumulated since World War II. The first eight chapters deal with theoretical and experimental material, and the last two chapters, Incisions Used in Gynecology and Clinical Approaches to the Concepts of Wound Healing, are of more practical value. The chapter on the metabolism of proteins and amino acids presents much controversial material, such as "The studies on the effect of injury on the level of total plasma proteins are not entirely consistent, some investigators reporting increases in the total plasma protein after injury and some reporting decreases"; and "No very marked changes occur in the levels of the various plasma proteins after wounding; those changes which do appear seem to be relatively nonspecific." Much of the material presented in this book is the result of experimental work on animals. One wonders about the specific species reaction and the value of such in human experimentation. Particularly singled out for careful study has been the role of ground substance, methionine, vitamin C, hormonal influences, and collagen. Although the major portion of the book is concerned with theory, at no time has Osler's principle, "primum non nocere," been forgotten. It was also refreshing to read this quotation from a contemporary teacher: "The basic fact that wound healing is a function of living tissues and is not hastened or stimulated but often retarded by any chemical agent applied to their surface is forgotten still too often." This book should be of value to those interested in theoretical and experimental considerations pretaining to wound healing. There is an extensive bibliography at the end of each section.

A Survey of State Pharmacy Laws Relating to the Sale by General Merchants of Non-Prescription Drugs, Variously Designated as "Patent or Proprietary Medicines," "Domestic Remedies," "Home Remedies," "Household Remedies," and by Similar Terms. Conducted by John M. Seus, B.A., LL.B., under a research grant from National Drug Trade Conference which is composed of delegates from American Association of Colleges of Pharmacy, American Drug Manufacturers Association, American Pharmaceutical Association, American Pharmaceutical Manufacturers' Association, Federal Wholesale Druggists' Association, National Association Boards of Pharmacy, National Association of Chain Drug Stores, National Association of Retail Druggists, National Wholesale Druggists' Association, The Proprietary Association. Paper. Pp. 112. American Pharmaceutical Association, 2215 Constitution Ave., N. W., Washington 7, D. C., n. d.

For many years the National Drug Trade Conference has been fostering uniform state legislation with respect to the practice of pharmacy and regulation of the production and distribution of drugs, medicines, and poisons. The conference committee on uniform state legislation has prepared "model" acts which have served numerous pharmaceutical groups as a basis for initiating or amending state laws. The committee is currently working on a "model" state pharmacy act, but it has not been able to reach an agreement in the area concerning restriction of the sale of nonprescription drugs, designated as "patent and proprietary medicines," "household remedies," or similar items. This survey was conducted to facilitate agreement and to provide a basis for developing definitions for the proposed uniform state pharmacy act. The report covers research on the statutory provisions dealing with permissive and restrictive provisions of state pharmacy acts. It should serve as a reference work for those engaged in the study of this subject.

Louis Pasteur: A Great Life in Brief. By Pasteur Vallery-Radot. Translated from French by Alfred Joseph. Cloth. $3. Pp. 199. Alfred A. Knopf, Inc., 501 Madison Ave., New York 22; McClelland & Stewart, Ltd., 25 Hollinger Rd., Toronto 16, Canada, 1958.

Few biographies combine the excitement of a novel and the scientific interests of the physician. This biography tells the story of the author's grandfather in an intimate and affectionate manner. The author is, in his own right, one of Europe's outstanding figures in medical research. The book describes some of Pasteur's least publicized accomplishments. Along with his theories on molecular asymmetry, fermentation studies on wine and beer, and research on viruses and vaccines, Pasteur even experimented in art, helping to eliminate the most annoying problem of the artist—the long period of time it takes the oil paint to dry. "Pasteur was a man with a practical mind. He carried his discoveries from the laboratory into the industrial domain.

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'Pure science, on its highest level,' said he, 'cannot advance one step without sooner or later bringing profit to industry from the application of its precious results.' Consequently, he discarded a differentiation between theoretical and applied sciences." Pasteur showed no less love for politics than he did for science, and, during his schooling, he once gave all his savings to the new republican government. Another accomplishment was his acting ability. Because he possessed that gift bestowed on superior minds—to perceive what remains hidden from the crowd—the book is a profitable review of the adventures of the scientist who is always being told his ideas cannot succeed. Pasteur's usual answer was that "man contradicts for the sake of contradicting and does not believe because he will not believe." Louis Pasteur was best described by his friend Senarmont, who said, "If he finds nothing on the road he is traveling, don't worry, he will not stay on it. But I would be surprised indeed if he does not find something."

Roentgen Diagnosis of Abdominal Tumors in Childhood. By Charles M. Nice, Jr., M.D., Ph.D., Alexander R. Margulis, M.D., and Leo G. Rigler, M.D. Cloth. $4. Pp. 75, with 53 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

In this monograph, the authors discuss the roentgenographic diagnosis and particularly the localization of abdominal masses in children by employing simple procedures available in most hospitals and private offices. The anatomic features pertinent to localization are stressed. Reliance is placed chiefly on anteroposterior and lateral projection films with the use of other simple diagnostic procedures, such as excretory urography, barium enema, and barium meal studies. When indicated, the use of more complicated procedures is discussed. In their discussion, the authors use as a working classification the following plan, based on topography: (1) intraperitoneal masses in the region of the liver, (2) other intraperitoneal masses, (3) renal and adrenal masses, and (4) other extraperitoneal masses. The subject matter is covered in a concise, easily read manner and is beautifully illustrated. This monograph is recommended without reservation not only to radiologists and pediatricians but also to surgeons interested in the preoperative diagnosis of abdominal tumors in children.

Drugs: Their Nature, Action and Use. By Harry Beckman, M.D., Director, Departments of Pharmacology, Marquette University Schools of Medicine and Dentistry, Milwaukee. Cloth. $15. Pp. 728, with 126 illustrations. W. B. Saunders Company, 218 W. Washington Sq., Philadelphia 5; 7 Grape St., Shaftesbury Ave., London, W. C. 2, England, 1958.

This new textbook on pharmacology invades an area of medical literature already replete with sound reference works. The author's pungent and clear style, however, makes this new publication admirably adapted to the needs of undergraduate students. The first section deals with an orientation of pharmacology among the other basic medical sciences, the second with the general nature and behavior of drugs, and the third, comprising the major portion of the book, with detailed descriptions of the actions and practical applications of drugs. Selected references are listed at the end of most of the chapters. The presentation of material under the main section, which deals with drug actions and uses, departs from tradition in the order with which the classes of agents are discussed. Most chapter titles indicate the actions of each class of drugs, for example, Drugs That Dilate the Coronary Arteries, and Drugs That Promote Renal Uric Acid Transport. Some unusual titles are Drugs That Are Enzymes, Drugs That Are Hormones, and Drugs That Are Vitamins. The presentation of material is refreshing, and the double-column pages provide easy reading. A fairly comprehensive general index is also included. A chart of infectious diseases, listing the preferred drug for each, is duplicated inside the front and back covers. Few errors were detected.

Occipitoposterior Positions. By Edward L. King, A.B., M.D., F.A.C.S. Publication number 310, American Lecture Series, monograph in American Lectures in Gynecology and Obstetrics. Edited by E. C. Hamblen, B.S., M.D., F.A.C.S., Professor of Endocrinology, Duke University School of Medicine, Durham, N. C. Cloth. $3.75. Pp. 106, with 60 illustrations. Charles C Thomas, Publisher, 301-327 E. Lawrence Ave., Springfield, Ill.; Blackwell Scientific Publications, Ltd., 24-25 Broad St., Oxford, England; Ryerson Press, 299 Queen St., W., Toronto 2B, Canada, 1957.

This small book on occipitoposterior positions is an excellent clinical review of this important subject. The author discusses the causative factors of delayed rotation and nonrotation and notes that anthropoid pelves favor this mechanism. The general management of labor in the patient in whom the occiput fails to rotate anteriorly is discussed. Definitive treatment by manual rotation of the fetal head and the various methods of forceps application and delivery are described. The author indicates his preference for the intravaginal rotation of the forceps blades to accomplish anterior rotation of the head. The failure of anterior rotation of the fetal head is probably less common today than formerly. Difficult delivery of the baby whose head has failed to engage deeply is avoided. In the final analysis, there are a number of good methods for correcting the failure of anterior rotation of the head, and it is the man behind the forceps and not the instrument or the method that determines the results. This small book can be read with profit by the student, the practitioner, and even the specialist.

QUESTIONS AND ANSWERS

TREATMENT OF UNDULANT FEVER

To the Editor:—*Please give information as to the modern treatment of undulant fever.*

Robert C. Bruder, M.D., Dearborn, Mich.

Answer.—Modern combined antibiotic therapy can induce prompt clinical remissions, may be life-saving, and may prevent much physical deterioraton, grief, and expense, but the drugs are bacteriostatic, not bactericidal, and the treatment is suppressive, not curative. In addition to invasion of body fluids and tissue spaces, intracellular colonization by Brucellae is a characteristic feature of the disease. Modern therapy helps to remove Brucellae from fluids and tissue spaces but does not harm those that lie within body cells. These remain viable and virulent and, in the absence of an adequately efficient natural defense apparatus, serve as sources of endogenous remissions and of bacteriological and clinical relapses, which may be few or many. Permanent recovery probably depends ultimately upon the efficiency of the natural defense apparatus. If the stimulus to this apparatus, owing to the disease itself and to the accelerated killing of extracellular Brucellae consequent upon modern therapy and associated with the general physiological advantages of a clinical remission, does not allow it to achieve a certain minimal degree of efficiency for that individual, a relapse will occur. This relapse, and others that may follow, may be treated similarly, with either eventual recovery or continued discouragement.

If two or three courses of tetracycline, 0.5 Gm. orally four times daily for 21 days, accompanied by streptomycin or dihydrostreptomycin, 1 Gm. intramuscularly twice daily for 7 days followed by 0.5 Gm. twice daily for a second week, cannot prevent the occurrence of continued relapses, it seems that modern therapy fails in a certain proportion of patients, and that further research is needed. If the supposition is correct that recoveries depend upon an effective stimulation of the defense apparatus by materials conveyed into the body by invading Brucellae, and if these natural stimuli are inadequate even when aided by repeated antibiotic effects, it seems that what is needed is additional, persistent, proper use of a carefully selected brucellar antigen to raise the patient's resistance above the level at which relapse is certain. A useful discussion of this aspect of treatment can be found in *Brucellosis*, by Harold J. Harris, Paul B. Hoeber, Inc., N. Y., second edition, 1950. Unless more effective antibiotics for brucellosis become available, the supplemental treatment with an antigen seems more in keeping with the known pathogenesis and host-parasite relationships of this disease.

BRITTLE FINGERNAILS

To the Editor:—*What is the cause and treatment of "brittle fingernails"?*

W. M. Fowlkes Jr., M.D., Wendell, N. C.

Answer.—Brittleness of the nails, a manifestation of fraying or peeling of the terminal portions of the nail plates, may be symptomatic of a score of disturbances, some associated with injury to the matrix, as is commonly found in a great many women in whom brittleness develops in the absence of any local or systemic abnormality. The first goal should be to try to determine whether there is any local disturbance present, such as something which has been applied to the nails. There may have been excessive manicuring of the nails, reaction to solvents used in nail polishes and lacquers, or sensitivity to detergents.

Some workers believe that these solvents have more of a dehydrating than defatting effect on the nails. The use of certain alkaline preparations by people who have their hands constantly in water, such as housewives and bartenders, is felt by some to be a primary factor in nail brittleness. Several observers have felt that gelatin given by mouth is helpful; however, Sutton feels that the underlying cause may be a hypoproteinemia. He feels that some of these patients need iron, thyroid, and estrogens, although the indications are rather ill-defined. There have been exacting studies made on some of the mineral and organic constituents of diseased nails. Calcium, which has long been undisputed in the treatment of certain nail conditions, was subjected to detailed study along with phosphorus and total ash content of the nail clippings taken from patients having hard and brittle nails, and it was found that there was no evidence that the brittleness or hardness of the nails was in any way related to calcium or phosphorus. Felsch and his group have shown that the free amino nitrogen content is low in a patient with psoriasis. They also studied the sulfhydryl group and the disulfide link-

The answers here published have been prepared by competent authorities. They do not, however, represent the opinions of any medical or other organization unless specifically so stated in the reply. Anonymous communications cannot be answered. Every letter must contain the writer's name and address, but these will be omitted on request.

age in normal keratinization as possibly being important in relation to the nails, as well as to the skin being studied.

As far as minerals are concerned, an interesting observation by Dietz reveals that administration of fluoride is helpful in cases of onychosis. His studies were to the effect that patients who had nail delamination desquamation associated with dental caries responded with marked improvement to the administration of sodium fluoride tablets in six weeks to two months' time. However, this preparation should not be given to patients under 12 years of age, and it alone is no panacea for all such cases—proper diet, among other things, is also important. In patients with hypothyroidism, the thyroid extract would be of definite help. The question of vitamins, lack of vitamins, or their utilization in the presence of brittleness of the nails has been described by some, and it has been found that the administration of vitamins A and D has been of considerable help. Vitamin A effects epithelization of cells, so that it is possible that in some cases it would be of definite help as far as brittleness of the nails is concerned. Pillsbury and co-workers point out that the underlying defect that promotes brittleness is an architectural abnormality in which these nails, unlike normal nails, have central thin plates extending laterally, there being no clue as to why this should occur. Naturally, excessive manicuring and the use of various preparations containing solvents would affect this type of nail more than normal nails.

The systemic causes of this abnormality are sometimes quite remote and may make difficult an absolute diagnosis. More knowledge of the local chemistry of the nail plate is to be desired. Certain fatty acids, particularly cholesterol, appear to assist in maintaining the natural elasticity of the nails, and, of course, the use of an emulsified form of water should be of some assistance in maintaining more moisture in the keratin of the nail. Lamination of the distal portions of the nails has been pointed out to be due to secondary anemia, and, in those instances, the condition responds to iron therapy fairly promptly.

ARTIFICIAL COLORING OF FRUITS

To the Editor:—*What chemicals are used in artificial coloring of fruits, especially oranges? Are any of these carcinogenic? Is ethylene ever used as a coloring agent? What laws have been passed restricting the use of these chemicals?*

O. G. Hamilton, M.D., Bluffton, Ind.

Answer.—It has been a practice of long standing to resort to coloring in order to improve the appearance of products. Synthetic coal tar dyes have been known only since the middle of the last century. Previous to that time, coloring materials used were of natural origin. In order to protect the health of the public, the United States government permits food manufacturers to use only such batches of coal tar dyes as have been tested by the Food and Drug Administration and have been found by this agency to be harmless and suitable for use. Such dyes are known as "certified" dyes. At the present time, this consultant is not aware of any evidence indicating that the coal tar dyes presently in use are carcinogenic. The Food and Drug Administration constantly keeps a very close check on these products, and should there be any suspicion of harm at all, such products are removed from the certified listing. Methods of artificial coloring of citrus fruits have been used extensively for many years. The use of ethylene gas in the coloring of oranges is practiced quite widely. The mechanism of this reaction is not known, but apparently the gas activates the upper peel of the orange and stimulates the fruit to renewed life activity for a period of from 5 to 10 days, thus bringing about a discoloration of the green pigment. One part of ethylene in five million parts of air can produce the effect. Since ethylene is highly volatile, there is no danger from any residual ethylene being retained by the fruit.

VITAMIN E IN HUMAN NUTRITION

To the Editor:—*What is the present status of vitamin E (alpha-tocopherol) in human nutrition? Is vitamin E of any value in the treatment of endochondrodystrophies such as slipped epiphysis, Legg-Calvé-Perthes disease, or Osgood-Schlatter disease? Is there any therapeutic difference between the natural and synthetic forms of the vitamin? Are there any good recent reviews of this topic?*

Richard G. Rosen, M.D., Fort Bragg, N. C.

Answer.—The status of vitamin E in human nutrition remains unclarified at the present time. Clinical syndromes associated with vitamin E deficiency have been diligently sought for many years; however, no human syndrome has been recognized which is directly attributable to lack of vitamin E or which is corrected by administration of vitamin E. Laboratory tests associated with vitamin E deficiency in animals (i. e., low alpha-tocopherol blood and tissue levels and increased red blood cell sensitivity to hydrogen peroxide) have been described in obstructive biliary cirrhosis; cystic fibrosis of the pancreas; newborn infants; and children with steatorrhea, thyrotoxicosis, and liver disease. Nevertheless, there is no evidence that lack of vitamin E played an etiological role in any of these conditions or that these laboratory tests were correlated with any symptomatology. There are no data available that permit a comment on whether or not these abnormal laboratory tests indicate a need for administration of vitamin E.

Knowledge of the action of alpha-tocopherol is inadequate. Tocopherols have a nonspecific antioxidant effect which is thought to represent a secondary role. Nason has suggested that alpha-tocopherol may act as a cofactor in the cytochrome C reductase system. There is no well-defined relationship between vitamin E deficiency and endochondrodystrophies. Lowered blood levels of vitamin E were reported by Ponseti; however, experimental vitamin E deficiency in animals and man is not associated with skeletal lesions of this type. Ponseti also reported that the skeletal lesions produced in animals fed Lathyrus odoratus seeds were not prevented by synthetic or natural vitamin E. We are aware of no reports that vitamin E is effective in these conditions.

The synthetic forms of vitamin E may vary in potency and solubility, and, in addition, some forms may inhibit other enzyme systems, at least in vitro. There is evidence that a recent water soluble form (d-alpha tocopherol polyethylene glycol 1,000 succinate) may be effective orally in patients with poor fat absorption. The various manifestations of vitamin E deficiency in animals have been reviewed by Dam (*Pharmacol. Rev.* 8:1, 1957) and in the *Annals of the New York Academy of Sciences* (vol. 52, Oct. 31, 1949). Skeletal lesions produced by Lathyrus odoratus seeds have been discussed recently by Selye (*Canad. Biol.* 16:1, 1957).

YELLOW FEVER IMMUNIZATION

To the Editor:—*With what frequency does postvaccinal encephalitis occur after subcutaneous yellow fever inoculation with the 17-D strain? Is there any reason why subcutaneous yellow fever vaccination and multiple pressure smallpox vaccination should not be given on the same day? How long after subcutaneous inoculation with 17-D strain vaccine are general systemic reactions most likely to occur?*

Hugh W. Randel, M.D., New York.

Answer.—Millions of doses of yellow fever vaccine prepared from the 17-D strain have been given without the development of any recognized complication other than the transitory mild fever, malaise, and headache which occurs in about 5% of persons receiving this vaccine. This reaction comes on about one week after vaccination, lasts about one day, and rarely interferes with normal activity. Some years ago, during the early use of the vaccine in South America, a few cases of encephalitis were observed after vaccination with a particular substrain of strain 17-D (Fox and others, *Am. J. Hyg.* 36:117, 1942). The use of this substrain was abandoned, and no such episode has been reported since then in the western hemisphere. However, in the last three years about 12 or 15 cases of mild, self-limited encephalitis without sequelae have been reported from England, France, and Africa in very young infants, occurring about 10-20 days after vaccination with the standard 17-D strain. In some of these cases, the clinical syndrome observed could not be ascribed to any other recent event, such as smallpox vaccination or a recognized acute infection. These episodes arose in the course of what must have been several hundred thousand yellow fever vaccinations. This actually represents an extraordinary record of safety.

On the other hand, the French neurotropic strain of yellow fever vaccine, which has been administered to perhaps 50 or 60 million people, has resulted in a small number of severe cases of encephalitis, some of them fatal. It would be fair to say that the neurotropic vaccine is not as safe as, for example, smallpox vaccine, whereas the 17-D strain of yellow fever vaccine is undoubtedly one of the safest vaccines in existence.

There is no known contraindication to simultaneous smallpox and yellow fever vaccination, which has been done innumerable times in persons scheduled for overseas travel.

INSECTICIDE INTOXICATION

To the Editor:—*A man was hospitalized for diagnosis and treatment of an illness which appeared to be of industrial origin. He complained of severe pressure in his head, dizziness, and lack of appetite; his wife described many personality changes (depression) over the preceding week. The dizziness seemed to be aggravated if someone sat on the bed or jiggled the bed at all and has become progressively worse. The patient's job is loading and working with grain which has been treated with many different poisons, including methyl bromide (Test Master), a liquid seed disinfectant (Panogen), and an insecticide containing piperonyl butoxide. He wears a gas mask when working. The blood bromide level was 5 mg. per 100 cc. (normal for this laboratory is 1 to 1.5 mg.). A 24-hour urine test for mercury was negative. After one week the patient was discharged, with no medicaments prescribed; at that time he felt much better. Could the intoxication cause all the symptoms of the patient?*

Duane F. Hyde, M.D., King City, Calif.

Answer.—Of the three mentioned insecticides, methyl bromide may be the chief suspect, although Panogen, which is cyano(methylmercuri)guanidine (methylmercury dicyandiamide), distinctly is toxic. In severe methyl bromide poisoning, the organs of foremost attack are the lungs, with pulmonary edema being the prime manifestation. The apparent absence of any lung involvement in the present instance suggests minor severity. Johnstone (Occupational Medicine and Industrial Hygiene, St. Louis, C. V. Mosby Company, 1948) thus describes low-severity cases: "In patients who have

been exposed to small but nevertheless harmful amounts over a period of time, the clinical picture is bizarre and almost unbelievable. This author examined 34 date packers at Indio, Calif., who had been exposed to methyl bromide for a period of several weeks. It will be noted that each patient complained of a visual disturbance which frequently constituted the first sign of trouble. Mental confusion and speech disturbances likewise occupied a prominent place in the incidence of signs and symptoms following methyl bromide poisoning. All these patients recovered without suffering permanent pathologic disability." The various signs and symptoms encountered were visual disturbances, speech disturbances, mild mental confusion, hallucinations, melancholia, coma, convulsions, apathy, tremor, neurosis, fainting attacks, and numbness of extremities. The basis for ascribing this condition to methyl bromide, if in fact it be of occupational origin, is the reported finding of a high level of bromide in the blood of the patient and, conversely, a negative finding as to mercury in the urine.

RECTAL PAIN WITH PROSTATIC DISEASE

To the Editor:—*A man complained of a small nodule in the right testis, present for several years. There was no pain in the testis, but there was deep-seated rectal pain. The nodule was excised, and because of suspected malignancy the testis was removed. The pathological report came back with "evidence of malignancy." A portion of the cord was removed, but no trace of malignancy was found. The deep-seated rectal pain continued for one year, and again the patient sought relief. At this time a nodule appeared in the left testis. A prostatic smear showed acid-fast bacilli. Tuberculosis had been suspected before, and the patient had been taking streptomycin, PAS, and isoniazid. After six months the prostatic smear is still positive. Would cortisone or its derivatives be indicated, and, if so, in what dosage? There is no loss of weight; the patient looks well and complains only of this deep pain.*

L. Tummers, M.D., Patna, Bihar, India.

Answer.—It is difficult to arrive at a diagnosis which will cover every aspect of the patient's genitourinary complaints. One cannot disregard entirely the evidence of malignancy which was reported by the laboratory. Nevertheless, a diagnosis of genital tuberculosis, beginning as a prostatitis and seminal vesiculitis, spreading first to the right epididymis and then to the left, naturally suggests itself and appears to be the most logical explanation for the sequence of events. Insofar as treatment is concerned, the administration of antituberculosis agents, including streptomycin, PAS, isoniazid, and pyrazinamide is definitely indicated. Cortisone should not be used because it would encourage spread of the inflammatory process. It is possible that the patient has a tuberculous abscess of the prostate gland. This would account for the rectal pain as well as the persistence of the infection in spite of the treatment. If an abscess does exist, adequate perineal drainage followed by the chemotherapy is most definitely indicated.

SYMPATHECTOMY IN DIABETIC PATIENTS

To the Editor:—*A 65-year-old man has been diabetic for the past 15 years. His circulation in both legs is deficient, and there is coldness of extremities and pain on walking. All symptoms of Raynaud's disease are present. There are two ulcers present, one on the plantar surface of the foot and the other on the inner malleolus. These have not responded to treatment. He has been advised to have a sympathectomy by a surgeon. What percentage of patients get favorable results with this operation? Would any other treatment be suggested before surgery?*

J. L. Snavely, M.D., Sterling, Ill.

Answer.—Insufficient data are supplied in this question to give a satisfactory answer. The presence or absence of palpable pulsation in the femoral and popliteal arteries would be helpful. The statement, "all symptoms of Raynaud's disease are present," needs to be clarified. Raynaud's disease is most commonly found in young people and is rare in diabetic persons. This patient probably has arterial insufficiency due to arteriosclerosis.

In the experience of this consultant, sympathectomy is not too beneficial in diabetic patients in this age group. If, however, the foot sweats or changes color easily when the patient is cold or nervously upset, vasomotor activity is probably present and sympathectomy might help.

If the popliteal and pedal pulses are absent, a femoral arteriogram to determine the presence of a local block in the femoral artery susceptible to an artery graft might be done. Before surgery is resorted to, a period of observation in the hospital with rest in bed, the best possible diabetic management, and the use of conservative measures should be tried.

CARCINOMA AND DIABETES

To the Editor:—*Is there an increased incidence of carcinoma among diabetics? If so, are there any types of malignancy more common in diabetics than in the general population?*

M.D., New Jersey.

Answer.—Many studies indicate a significantly increased incidence of cancer in the diabetic population. Reviewing the experience of the Baker Clinic, Marble (*New England J. Med.* 211:339, 1934) found 256 cases of cancer in 10,000 diabetics. Joslin and others (Treatment of Diabetes Mellitus, ed. 9, Phil-

adelphia, Lea & Febiger, 1952) reported an increase in the incidence of cancer as a cause of death among diabetics from 1.5% in 1900 to 9.6% in 1952 and concluded that this was due to an increased longevity of the diabetics since the onset of the insulin era. McKittrick and Root (Diabetic Surgery, Philadelphia, Lea & Febiger, 1928), Inglefinger (*New England J. Med.* 235:653, 1946) and Marble have reported that cancer of the pancreas accounted for between 13 and 32% of the cancer noted in diabetics as compared to a total population frequency of approximately 3.5% of all cancer patients. Glicksman and Rawson (*Cancer* 9:1127, 1956) and Marks and Bishop (*J. Clin. Invest.* 36:254, 1957), independently, have reported, recently, that altered carbohydrate metabolism as well as overt diabetes appears to be significantly associated with neoplasia. It is interesting to note that patients with neoplasms of the endocrine organs had the highest incidence of diabetes; of particular interest in this regard was cancer of the endometrium. Thus, not only is there an increased incidence of cancer in the diabetic population, but there appears to be a significant increase in altered carbohydrate metabolism and overt diabetes in the cancer population.

INTRAVENOUSLY GIVEN BARBITURATES FOR SHORT-TERM SURGICAL PROCEDURES

To the Editor:—*Is it considered good medical practice to use barbiturates intravenously as the sole anesthetic agent to obtund pain in reduction of fractures of the extremities or in the performance of a simple mastectomy? Should a barbiturate be used intravenously for analgesia?*

Milton Jabush, M.D., Lakewood, N. J.

Answer.—It is considered better anesthetic practice to combine 70% nitrous oxide and 30% oxygen with the ultra-short-acting intravenously given barbiturates. These latter agents, although excellent hypnotics, are poor analgesic drugs. The addition of the nitrous oxide–oxygen mixture provides the analgesia, increases the available oxygen, decreases the total amount of barbiturate required, and thus shortens the postoperative recovery period. Probably of equal or even more importance is the fact that when this method is used, the anesthesiologist must pay more attention to the patient's respiratory exchange. If difficulties of this nature arise during the operation, the anesthesia machine is at hand and resuscitative treatment can be started immediately.

Answer.—Thiopental sodium, given intravenously, is a very efficient analgesic or anesthetic agent for short-term procedures such as the reduction of fractures or dislocations. It is quick acting and its effects rapidly clear after the injection has been stopped, leaving minimal side-effects such as nausea or vomiting. However, it should never be used without proper care to safeguard the patient, such as having available oxygen and someone completely familiar with its use.

VITREOUS OPACITIES OF THE EYE

To the Editor:—*A 43-year-old man has vitreous opacities in the form of muscae volitantes. He claims they have been present for at least 25 years, but he thinks that recently they have tended to grow worse. He has a mild chronic conjunctivitis and a chronic amebic colitis, acute flare-ups of which make the condition worse. He has an 0.25 D. astigmatism, and his near point is now 24 cm. His visual acuity is better than average, probably 30/20. Is there a reasonably effective treatment?*

Santiago Barahona Streber, M.D., Mitla, Oaxaca, Mexico.

Answer.—The mild, chronic conjunctivitis and the chronic amebic colitis are most probably related. The chronic conjunctivitis should be treated over a long period with a 30% solution of sodium sulfacetimide. The chronic amebic colitis should be treated by the proper gastrointestinal drug. X-rays of the teeth should be made and any apical abscessed tooth removed. Once the vitreous opacities have formed and are increased, there is one method of removing them surgically. This is a rather drastic procedure, to be considered only if the medical treatment does not improve the condition. The procedure consists of a removal of the vitreous and an injection of either spinal fluid or vitreous from a freshly enucleated eye into the globe. In this way the opacities in the vitreous body would be entirely done away with. It is unusual for an individual to have muscae volitantes for years and then suddenly experience an increase due to intercurrent infection. Recently, many such patients have improved on steroid therapy, but this should not be used until all other methods have been tried.

UNEXPLAINED RASH OF TEN MONTHS' DURATION

To the Editor:—*A 3-year-old girl is in good health except for a discrete maculopapular rash that began 10 months ago on the chest and has spread to the neck, upper forearms, and thighs. There is no infectious problem and no weight loss since the beginning of the rash and no known food allergy or familial disease. The patient has been treated for psoriasis without benefit.*

L. A. Dunton, M.D., De Land, Fla.

Answer.—From what can be determined, the most likely cause of the eruption is insect bites. Fleas, mosquitoes, or other such insects could cause such a condition. Treatment with 10% pyrethrum and 1% chlorophenothane in calamine lotion could be utilized. This should be applied to the lesions

as necessary, for itching, and to the entire body except the face and hands upon retiring. The parents should be warned that the preparation is poisonous and must be kept out of the child's mouth. Another diagnostic possibility would be urticaria pigmentosa. In this condition, rubbing the lesions causes the formation of an urticarial wheal in and around the involved areas. Diagnosis is established by finding a mast-cell infiltrate on examination of an appropriately stained specimen obtained by the performance of a biopsy. The cause is unknown, and there is no known effective treatment.

EFFECT OF SULFURIC ACID ON TEETH

To the Editor:—*Please inform me of the effect of sulfuric acid gas on tooth enamel, porcelain fillings, and gold inlay. A laboratory technician has been pipetting N/12 solution of sulfuric acid for blood glucose determination. Her dentist has raised the question of enamel decay and porcelain stain due to sulfuric acid.*

Allan V. Morgan, M.D., Pittsburgh, Pa.

Answer.—There is little doubt that continued pipetting of sulfuric acid without proper precautions will eventually cause etching and partial solution of the enamel. The rate and degree of injury will depend on how much acid actually comes in contact with the enamel and how long it remains on the enamel surface. Acid etching can be felt by the tongue as a sour taste and a roughening of the enamel surface. Damage to the enamel can be minimized by using a long rubber tube on the end of the pipette and by a thorough mouth rinse with a bicarbonate of soda solution if acid is suspected to have entered the mouth. Synthetic porcelain fillings are also dissolved by acids. The enamel margins around gold inlays may also be attacked by acids, causing them to fall out.

POST-HERPETIC NEURALGIA

To the Editor:—*A patient, aged 77, has had a herpes zoster ophthalmia for many months. He still has rather marked pain despite all treatments. Please give suggestions.*

Robert O. Sherwood, M.D., San Mateo, Calif.

Answer.—The pain mentioned is apparently due to post-herpetic neuralgia, since no mention is made of the eyeball (glaucoma, uveitis, etc.). If current methods of treatment, including corticosteroid therapy, do not relieve the severe pain, chemical or surgical nerve block or/and radiation therapy should be considered. Procaine or alcohol injection may be used peripherally or in the sensory root of the gasserian ganglion. Surgical section involves the same locations or/and the spino-ophthalmic tract. Radiation therapy may be applied to the gasserian ganglion and/or spinal nerve roots. Surgical nerve blocks and radiation therapy should be done only by those familiar with the techniques, risks, and benefits involved.

ASPERGILLUS EAR INFECTION

To the Editor:—*A patient has what appears to be, on culture, an Aspergillus infection of the ears. He has been to seven doctors, including specialists in large cities, without help. Will x-ray therapy be beneficial? How often is aspergillosis pathogenic? What additional medication is indicated?*

M.D., Alabama.

Answer.—Aspergillus is a common type of mold found in ears of patients with external otitis. It is believed to be a secondary infection and not the primary agent in most of these cases. Staphylococcus aureus and Pseudomonas aeruginosa are the usual causative organisms of the external otitis, with the Aspergillus as a secondary infection. Ear drops of sulfisoxazole otic solution, combined with careful cleaning of the external auditory meatus, is usually effective in these cases. If it is an allergic dermatitis, attention should be given to the allergic factor. X-ray treatment is not as likely to be as helpful as careful cleaning and the use of an appropriate antibacterial medication. A 1% thymol concentration in creatine as ear drops has been recommended as specific for the Aspergillus mold infection.

VITAMIN AND MINERAL SUPPLEMENTS DURING PREGNANCY

To the Editor:—*What is the current status of vitamin and mineral supplements during pregnancy? Are iron and calcium supplements necessary with a well-balanced diet?*

M.D., Virginia.

Answer.—The level of nutrient intakes recommended by the food and nutrition board of the National Research Council for pregnant and lactating women can be attained through the use of properly chosen foods and without the addition of any dietary supplements. If any doubt exists as to the adequacy of the previous diet, it may be desirable to administer iron, calcium, vitamin D, and the B vitamins. Frequently, because of calorie restriction and/or inability to drink milk, iron and calcium supplements are prescribed. The need for these must be individually determined.

PREVENTING PERSPIRATION ODOR IN SHOES

To the Editor:—*Is there any procedure that will prevent or abolish the perspiration odor which leather shoes may acquire after prolonged use?*

M.D., California.

Answer.—No way is known to deodorize leather once unpleasant odor has developed. However, the odor may be prevented from developing in the

first place. This involves daily care of the feet. Bacterial decomposition of body excretions has considerable influence on objectionable odors which arise in the axillas, groin, and on the feet. If one were able to wash frequently enough, this odor could be controlled. In a few persons, washing the area once a day is sufficient. However, in the majority, a deodorant is necessary for complete control. It is also well known that clothing which encloses the area develops an odor. For this reason, daily changing of socks will help the situation considerably. A number of foot deodorants containing antibacterial agents are available. If an adequate foot product cannot be found, a cream, lotion, or stick underarm-deodorant which contains an antibacterial agent can be used.

LERICHE'S DISEASE VERSUS LeRICHE'S SYNDROME

To the Editor:—*What is the difference between Leriche's disease and LeRiche's syndrome?*

M.D., Michigan.

Answer.—Correspondence received in the Standard Nomenclature office reveals confusion between the conditions known as Leriche's disease and LeRiche's syndrome. The terms are being used interchangeably, which results in erroneous classification. Leriche's disease is an acute bone atrophy developing at the site of injury or inflammation. The bone injury or infection must be specified with .9 to indicate atrophy. LeRiche's syndrome should be classified and coded 4616-942.7 Thrombosis of abdominal aorta (saddle-shaped) due to arteriosclerosis. The thrombosis is usually lodged at the bifurcation.

POSTPARTUM PSYCHOSIS

To the Editor:—*Is there some way to officially (that is, according to some standard nomenclature) diagnose postpartum psychosis?*

M.D., Ohio.

Answer.—The term puerperal or postpartum psychosis does not represent a clinical entity. Studies have established that any psychosis may have its incipience during pregnancy or after childbirth. In a group of 83 cases studied, 51.8% were classified as dementia praecox, 42% as manic-depressive, and 7% as psychopathic personality. It is interesting that the complications of pregnancy and labor, such as puerperal infection and the toxemias, no longer play an important role in the causation of puerperal psychosis. In the above group of patients, two had toxemias of pregnancy and two prolonged labors. The recurrence of puerperal psychosis in a subsequent pregnancy would depend on the diagnosis and the response to therapy. These would likewise determine the advisability of a subsequent pregnancy.

TOXIC CHEMICALS IN ANIMAL FEED

To the Editor:—*I would like to take exception to the answer given by an expert in the "Questions and Answers" section in* The Journal, *Feb. 1, 1958, page 354, regarding an animal feed additive which might cause dilatation of the pupils in workers mixing the feed. This is the disturbing part: "Lacking precise information, there is reason, cautiously, to suspect furazolidone and nitrofurazone. The only basis for this suspicion is that certain other complex furan compounds are regarded as possible substitutes for atropine. Dilatation of pupils in itself may be relatively unimportant but may constitute the initial indication of far more significant damage." It is believed, however, that neither of these nitrofurans, nitrofurazone or furazolidone, is responsible for this condition, for the following reasons: 1. Nitrofurazone ophthalmic ointment and liquid have been on the market for a period of seven years, and apparently there have been no reports of its causing pupillary dilatation in the world literature. 2. Nitrofurazone has been administered orally in about 50 individuals on an experimental basis for the treatment of testicular neoplasms. The dosage has ranged from 1.5 to 2 Gm. per day up to 21 days, and pupillary dilatation has never been reported. 3. Furazolidone has been administered to over 300 individuals in doses of 400 to 1,000 mg. per day for periods varying up to 21 weeks, and mydriasis has never been reported. 4. In the production of these nitrofurans for 12 years, workers have been exposed almost constantly to these compounds five days a week throughout this period. These employees have been checked on a number of occasions, and never has a pupillary dilatation been detected in any of them nor has there ever been a complaint to this effect. 5. The consultant answering this question stated, "The only basis for this suspicion is that certain other complex furan compounds are regarded as possible substitutes for atropine." To my knowledge, the only furan derivative that has been tried is furtrethonium iodide, which is reported on page 176 of "New and Nonofficial Remedies" for 1953 as having a parasympathomimetic action and thus is a miotic rather than a mydriatic agent. 6. Both of these compounds, nitrofurazone and furazolidone, have been tested extensively in animals for toxicity as well as activity. This includes instillation in the eyes of animals. Pupillary dilatation has never been produced. In view of this information, these nitrofurans should not be incriminated in any way in the situation described by the questioner.*

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